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A Cart Stallion.

The Property of Mr. Thomas Bryan, of Knossington, near Oakham; for which the First Prize of £10 was awarded at the Northampton Meeting of the R.A.S. of England, July 1847.

London. Published by Joseph Rogerson, 24, Norfolk Street, Strand, 1848

THE FARMER'S MAGAZINE.

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VOLUME THE SEVENTEENTH.

(SECOND SERIES.)

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THE FARMER'S MAGAZINE.

JANUARY, 1848.

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PLATE I.

A CART STALLION.

Young Sampson,

The subject of this Plate, is a handsome chestnut Cart Stallion, four years old, seventeen hands high, the property of, and bred by, Mr Frederick Thomas Bryan, of Knossington, near Oakham.

In 1845 this horse obtained the prize of £15 at the Royal Agricultural Society's Show at Shrewsbury, as the best two-year-old. In 1846, he obtained the prize of £15 at the Royal Agricultural Society's Show at Newcastle, as the best three-year-old; and in 1847 he obtained the first prize of £40 at the Royal Agricultural Society's Show at Northampton, as the best stallion for agricultural purposes: he also won the prize at Leicester at the last show.

Young Sampson was got by a roan stallion, the property of Mr. Daintree, of Hemingford, which took the prize of £15 at the Royal Agricultural Society's Show at Bristol in 1842, as the best two-year-old. In 1843 this stallion was purchased by Mr. Bryan, and obtained a prize as the best three-year-old in Extra Stock at the Royal Agricultural Society's Show at Derby; and in the same year he obtained a prize at Leicester. He was bred by Mr. Richard Brown, of Elsworth, Cambridgeshire, from a beautiful chestnut mare by "England's Glory." "England's Glory" was got by "Honest Tom," the property of Mr. Wiseman, of Whappole, Lincolnshire, and was sold by Mr. Wiseman for 400 guineas.

PLATE II.

SOUTHDOWN RAMS.

The subject of the second Plate, two Shearling Rams, Southdowns, were bred by, and the property of Mr. Jonas Webb, of Babraham, Cambridgeshire, and obtained the first prize of £40, and the second prize of £15, at the Royal Agricultural Society's Meeting at Northampton, in July last. It would be a work of supererogation to offer any remarks commendatory of Mr. Jonas Webb's breed of sheep, its reputation being established not only in the United Kingdom, but also in our distant colonies and in foreign countries.

ON THE ECONOMY OF THE REFUSE OF TOWNS, AND ITS CONVERSION INTO MANURE.

BY ALFRED GYDE, ESQ., M.R.C.S.E., CHEMIST TO THE NORTH STAFFORD AND STEWPONEY AGRICULTURAL SOCIETIES, &c.

A period like the present, when the probability of the cholera again visiting our shores has called into active operation the services of boards of health and sanatory committees in most of our towns and villages, presents a golden opportunity to the farmer, not only of supplying himself with a store of manure for spring use (possessing high fertilising powers), but of establishing such a connexion with the authorities as will ensure a constant supply of manure for future consumption, or for the market, should he feel disposed to become a manufacturer for sale.

To the continental chemists, and more especially to Liebig, we are indebted for the fact, that in order

to maintain and increase the fertility of the soil, we must restore to it such elements as have been abstracted by the crops cultivated as food (the mineral constituents, and more especially the phosphates, being of the most importance); and although in all well-regulated farms much care is taken to accomplish this as far as the economy of the manures of the farm is concerned, yet those substances which are most efficient in this respect (and which constitute the offal of towns) are wantonly wasted, nay, even worse than wasted; for that which, with a little attention, might be converted into food for thousands (increasing the profits of the farmer and the productive powers of the land) is rendered a source of suffering, disease, and death to the inhabitants of our towns, by polluting the air they breathe with those gases which emanate from the numerous foci where putrefactive decomposition is going on. The most valuable of these matters consist of the solid and liquid excrements of man, the blood from the slaughter-houses, and the carcasses of dead animals; the two latter are sometimes rendered useful as food for pigs. The former, although direct experiment has proved it to be capable of producing an amount of food equivalent to that from which it was obtained, is almost as universally neglected in this country as it is eagerly sought after and carefully preserved in other countries having any pretensions to agricultural skill.

The principal causes giving rise to this neglect are the disagreeable and offensive odour generally accompanying its removal in a recent state, and the difficulty of applying it to the land in the state in which it is obtained, or diluted with water and used as a liquid manure. These difficulties may be more readily overcome than is generally imagined; and to those who would prepare it in quantities we may describe the process which has been adopted for a considerable period at Montfaucon, in the neighbourhood of Paris, where the night-soil of that populous city is converted into a dry manure, which readily passes the drill, and constitutes an article of internal commerce of no inconsiderable importance to the agriculture of France. It is also frequently purchased and exported to Holland and Flanders, where it is mixed with their liquid manure previous to its application to the land.

Although many of our countrymen are as familiar with Paris, its beautiful gardens, its palaces and triumphal arches, as they are with London, yet few are aware of the existence of an establishment such as Montfaucon, and fewer still have taken the trouble to visit it, although situated almost under the walls of the city. Montfaucon for ages has been the great charnel and offal-house of the French metropolis; and, in addition to this honourable distinction, it also enjoyed, until the close of the last century, the distinction of possessing within its precincts the gibbet on which malefactors were executed. The gibbet has long ceased to grace the heights of Montfaucon; but in other respects it remains the same. Paris is situated in a valley, through which runs the Seine; and occupies the space comprised between the river and the ridges by which the valley is formed. On the north-west side of the Seine, about two miles and a half from the river, and within half a mile of the Faubourg St. Martin (one of the most populous districts of Paris), are the hills called the "Buttes Chaumont;" on the declivity of which we find Montfaucon. Thus this establishment is situated within a quarter of a mile of the boundary-wall of Paris, and within a mile and a quarter of the populous Boulevard St. Martin, one of the most crowded thoroughfares. It occupies a space comprising about sixty acres, from the brow to the base of the hill; the latter presenting, at its highest point, an elevation of about a hundred and twenty feet above the city, which it limits. Formerly one-half of the extent was apportioned to the slaughtering of the Paris horses that age or infirmities had brought to the usual violent close of their labours. This department of Montfaucon, however, has now for some years past been transferred to the Forest of Bondy, situated about twenty miles from Paris. Anteriorly to this change the remaining half of the inclosure was, and now the whole is, the receptacle of all the immundicities of Paris.

Paris, until within the last few years, was without drains or sewers of any description, although most admirably situated for their establishment; the two halves of the city being built on slopes towards the river, which passes through the centre. Owing to their absence, the rain, as well as the domestic waters of private houses, was made to run through the centre of the streets towards the river. Within the last few years these foul streams have disappeared in the principal streets; drains having been constructed which carry off the waters to the river. There are, however, still no sewers connected with the necessaries; nor can we say whether it would be possible to establish them, the supply of water being very scanty indeed.

Until within the last few years all the houses, and even now the majority of those which are situated in the poorer districts, had a large fosse excavated in the centre of the foundations, on a level with the cellars, and opening into the court-yard by a circular orifice. It is into this fosse that all the necessaries empty themselves. In a general way the orifice is closed with a large stone, and hermetically sealed; but at stated intervals, generally twice a year, it is opened and the contents abstracted. As may be supposed, this is always done

in the dead of the night: but there must be few of our readers, who, having visited Paris, will not remember meeting more than once, on returning home late, with the paraphernalia which accompany the nightmen, huge carts called "tombereaux," with huge tubs or barrels in them. The opening of these fossæ, and the first labours therein, are not unattended with danger, unless proper precautions have been taken to destroy the mephitic vapours which are exhaled in abundance on first exposing their contents. The fluid portion being first pumped out, the men descend and bring out the solid contents in tubs.

In the more modern establishments the fosse still exists; but instead of being allowed to fill itself gradually, as those which we have just described, it contains several tubs, which are, one after the other, placed under the tubes connected with the necessaries, and, when full, are closed and carted away during the night. Whatever system is followed, however, the barrels and their contents are finally conveyed to Montfaucon. Montfaucon occupies, as we have stated, the declivity of the "Buttes Chaumont;" a fact necessary to bear in mind in order to understand what there takes place. One half of the upper portion and the entire lower portion presents a series of tanks or reservoirs. The two superior tanks are one underneath the other, separated by a cart-road: the third and fourth are on a line underneath the second; the fifth, sixth, and seventh are also on a line, and occupy nearly the entire width of the lower section of the area. These reservoirs vary from about three to six or eight acres in extent, the three forming the lower line being the most extensive. They all have shelving banks, and present a depth of eight to ten feet.

The cart-road from Paris skirts the side of the area, winding its course beneath large black mounds of manure, until it arrives nearly at the summit; it then turns inwards, and passes between the two upper tanks; this, the terminus of the road, is what they call the "décharge" or discharging place. The more solid portion remains in the upper reservoir—the more fluid oozes through a grating situated at the further extremity, and flows down a kind of ravine at the end of the road into the second tank; here again, after depositing an abundant sediment, it passes off through a gutter several feet wide and deep, into the two subjacent ones, from whence the most liquid portion finally gains the three inferior tanks, there to stay at rest. The contents of the superior tanks are in a semi-solid state; but the inferior ones appear, at their surface at least, to be perfectly liquid. These inferior reservoirs present the aspect of small lakes of urine, and have several boats on them.

The local description of Montfaucon we have given will enable the reader to understand what subsequently takes place.

The tanks gradually become filled with solid matter, and, when this is the case, have to be emptied. The period which elapses before they arrive at repletion varies necessarily with the position they occupy; the highest one being emptied every six or nine months, the subjacent ones every year, those underneath every two or three years, and the lowest every six or seven years.

When a tank has to be emptied, if there is any superincumbent fluid, it is drawn off; the solid mass underneath is then exposed for a time to acquire a degree of firmness, when it is dug out and carried to an open space, where it is carefully spread on the ground to dry. When dry, which generally occupies about a week or ten days, if the weather be dry and warm, all the stones are picked out, and it is carried away in wheelbarrows, to be deposited on the mounds we have already alluded to. The mounds are entirely composed of this manure, which is of a black colour and almost devoid of odour.* They are of great extent, and from twenty to thirty feet high; indeed they almost appear, at first sight, to be small natural hills. Those portions which are exposed to the air are often covered with crystals of carbonate of ammonia; and this salt is extracted in great abundance from the fluid which the tanks contain, at a manufactory situated in the centre of the declivity. The manufactory was established some twelve years ago by several chemists, with the permission of the authorities, and has been very successful in its operations.

Such, then, is the manner in which the night-soil and refuse of the second city in Europe is converted into a manure, the value of which to the agriculture of France may be estimated from the circumstance that a proposition to construct sewers connected with the water-closets of Paris, by which the whole refuse of the city might be carried into the Seine, was negatived, solely on the grounds of the value of the manure to the agriculture of the kingdom.

While such an establishment as "Montfaucon" has been in existence for ages in France, it is a matter of some surprise that, until within the last

* A portion chemically examined gave the following composition:—

Moisture	24·0
Organic matter	5·2
Saline matter (soluble)	1·1
Inorganic matter, containing phosphates	69·7
	100·0

But the composition necessarily varies with circumstances, as exposure to rain, &c.

two or three years, no effort has been made to render the sewerage of the metropolis available for agricultural purposes. The application of science to agriculture has, however, thrown much light on the value, as manure, of subtances which for ages were considered as worthless, and consequently got rid of in the easiest way practicable. Of such is the sewerage and other refuse of towns, the direct application of which to the soil has proved most satisfactory, and has led to the establishment of two companies for the purpose of rendering the sewerage of London applicable as a manure. But, leaving these companies to their own modes of preparing and applying the sewage of London, we may state that the night-soil and ashes, with other refuse of our provincial towns and villages, may be converted into manure, which practical experience has proved most efficient, and which, from the cheap and easy manner in which it is effected, might be adopted on any farm within a reasonable distance of any town. It consists in the construction of a tank, or tanks, of brick-work (the most convenient size is about twelve feet long by six feet wide, and about six feet deep), provided with a channel or drain near its lower edge, which communicates with the liquid-manure tank of the farm. Into this tank the night-soil is discharged, which is collected in tubs, as in Paris; or what is far preferable, in a cart rendered water-tight and provided with a sluice or valve at the back, which, when opened, allows the contents to discharge itself, by means of a wooden gutter place beneath it, into the rank, the cart being covered with wood, with a trap-door, which opens to receive the soil in the top; the body of the cart being placed as low between the wheels as practicable, to facilitate the loading. In a cart so constructed night-soil can be removed to any distance, without annoyance from the disagreeable odours which it evolves. Before the night-soil is allowed to flow into the tank it is from one-third to one-half filled with coal ashes and other dry matters collected from the town, which is firmly pressed down; or, in the absence of this, burnt soil forms an excellent material; or soil and ashes mixed with saw-dust. The tank having been thus charged with dry matter, the night-soil is allowed to flow on it; the liquid portion, slowly percolating the dry mass, finds its way by the drain to the liquid manure tank, while the solid matter becomes incorporated with the filter of ashes. Fresh ashes may be added, and the addition of night-soil repeated, until the tank is full, when a few days' rest is sufficient to render the whole mass dry enough to dig out: it may then be placed in heaps under sheds, where it will undergo fermentation and gradually dry; so that, in a month from its preparation, it is fit to pass the drill, or be distributed by the hand. The offensive odour almost entirely disappears on the day after it is placed in the tank; or, if it is desirable to remove it at once, this may be effected by adding to each ton of night-soil two pounds of sulphate of iron and a quarter of a pound of chloride of lime, mixed, and dissolved in a little water; this preparation costing less than sixpence, and it has the advantage of fixing any ammonia which would escape, without acting injuriously on vegetation. A manure so prepared is a dark pulverent mass, possessing but little odour, and capable of being used as guano. When exposed to the air in summer it soon becomes encrusted with saline matter and salts of ammonia; and hence, like all other manures containing soluble salts, it should be carefully protected from rain and moisture. As a fertilizing agent it is most efficient, producing heavy crops of roots, and is an excellent top-dressing for clover or grass land.

Painswick, December, 1847.

NOTES OF AN AGRICULTURAL TOUR THROUGH NOTTINGHAMSHIRE.

BY M. M. M.

Part II.

Our last budget of notes referred mainly to the cultivation of the "light-land district," and before entering further upon agricultural details it may not be amiss to give a few statistics we picked up on our journey. The county is somewhat of an oval figure, about fifty miles long and about twenty-five miles broad. The population amounts to 249,773, and has much increased during the last forty years; for according to the census of 1801 it was only 142,829. The quantity of land in the county amounts to 535,680 acres; and as but 501,500 acres are rated to the poor, we infer that there are upwards of 30,000 acres of waste. Some of this will of course comprise roads and rivers, but for these we have allowed 4,180 acres. It appears, therefore, that as there can be but little land at so high an elevation as to prevent its being cultivated, there is much to do in the way of reclamation even in this highly favoured county. The estimated annual value of the land and buildings in

1836 was £276,070. The total cost of the poor for the county in 1840 was nearly £78,000, being levied at the rate of 1s. 11d. in the pound. The number of the inhabitants to the square mile is 298; the number of criminal offenders is 329, being a proportion of one and three-tenths per thousand inhabitants.

The difficulties of reclaiming forest land are, we believe, rather of a legal than of an agricultural kind. On little of its extent is drainage required, the soil and subsoil are so porous, and the land lies generally so high and sloping that the water never remains on the surface to any extent; and thus one of the most formidable and expensive obstacles to improvement is not to be contended with. The difficulty is rather to prevent the wind carrying away the soil than the water stagnating in it. The sheet-anchors of improvement are—consolidation, sheep, bones, and linseed-cake. The bones produce the green crops; these, assisted by cake, keep the stock; their refuse grows the corn.

It must not be supposed, however, that little has been done in this direction. Thousands of acres of wheat and barley, and thousands of well-fed animals, are substituted for the waving thistle and the worthless heather. Much is still doing, and we hope the reproach of barren sheep-walks will ere long cease to disgrace the county. We know not where the obstacles originated, but we hope they will no longer be permitted to prevail.

From what has been stated above, it will be seen that rapid advances in the forest cultivation have taken place since the report of Mr. Low in 1813. He says, page 23, on the best land:—"It appears that on the best land there could be but one crop of wheat grown in eight or nine years, while on the bad land, so called, none was attempted; turnips, oats, seeds, which lay five or six years to recover, and care being taken to stub the whins constantly." Now by sheep-feeding, cake, and bone manure, every conceivable crop is growing in all its richness and, especially abundant produce of wheat, giving 35 bushels per acre, and that once in five years.

The strong soils of the county are, as we have said, not of a very tenacious character; the whole may be said to be fallowed by two horses. In most places if it were thoroughly deprived of the top water by drainage it might be called, and would be called in many districts, red-clay loam. Although it is far from being ill-farmed; nay, for strong land it may be said to be better cultivated than most districts—the fallows are well worked, the fences are straight and in excellent order; no unsightly unploughed headlands occur; beans are chiefly hoed—still there are furrows and ridges, and therefore bald places, and instances of failure of crops by wet, and aquatic weeds peeping up here and there, which denote that farming has not done all that it is capable of effecting.

If from Gringley-hill or Wheatley-hill the eye is allowed to stretch over the waving corn, or clean-looking red fallows, or green refreshing beans, the traveller might note down that it was a well cultivated district; but if he descended and examined the detail, he would see that the capabilities of the soil were far from being fully developed.

The ordinary course adopted is precisely the same which it evidently has been for many years: 1, fallow manured; 2, wheat; 3, beans hoed. A portion of the farm is employed as follows:—1, fallow; 2, wheat; 3, red clover; 4, wheat. No oats are grown in the county of any consequence: even the "skegs," the oats almost peculiar to the county, and once so sedulously cultivated, are now nearly vanished to give place to wheat, barley, and sheep.

The fallows are almost invariably ploughed by two horses abreast, crossed and worked by a harrow peculiar to the county, and generally got in good order. The manure is spread on at the rate of six to ten loads per acre, and a small dose of lime is occasionally given. Near the Trent the Brotherton lime is used, which is brought up in boats; but in the interior the Mansfield Woodhouse lime is applied in very small quantities—one chaldron per acre. If more be applied, it is said to have a burning quality, and the bottoms of the heaps are said to be burnt so as to prevent vegetation. The Brotherton lime is of a less caustic quality, and may be applied with less fear. Very few turnips are grown; and those only for the necessary wants of the stock. To the grass land, therefore, keeping the stock, they have almost alone to look for manure Rape-dust, however, is a little used, and cake for the beasts; still the want of green crops operates very much against them.

The wheat, seldom hoed, but kept pretty clean from top weeds, is usually sown at the rate of two-and-half bushels per acre, often broadcast, sometimes drilled and ribbed. It is principally shorn, mowing being prevented by the unevenness of the surface.

The beans are invariably drilled about twelve or fourteen inches apart, and hoed twice. Sometimes peas are mixed with the beans, and in many cases appear to answer well. If sown in the drills, and the crop be a good one, they are useful. When turnips are sown, they are pulled off generally for the young stock and milk cows.

Mr. Parkinson, of Leyfields, near Newark, has shown what can be done for the strong land; not an inch of unlevel ground, not a ditch or furrow, and, indeed, not a weed occurs on his farm; the whole of his land being underdrained, at six feet

apart, and at a depth of about twenty-one inches; previous drains being cut seven or eight feet, to dry the springs. His rotation of crops is somewhat singular, but explains itself, and evidently works well. It is—1, turnips; 2, barley; 3, seeds; 4, seeds; 5, oats; 6, wheat; 7, turnips; 8, barley; 9, red clover; 10, wheat. He has not an acre of open fallow upon his farm: every particle is employed in growing crops. None of the crops, except the turnips, are hoed, nor require it; nor are any artificial manures applied to them. The quantity of stock kept makes an enormous quantity of manure; and being well kept, it is of very superior quality. Every turnip is pulled off. The soiling of these with tares and clover makes great quantities of manure almost the whole year through. The manure is not suffered to accumulate about the premises, but conveyed away to the field nearly as made, and always covered with soil both at the top and sides. A very liberal quantity of this is given to the turnips, as may well be supposed; and a compost is drilled over the ridges, consisting of the cuttings of the whole of the hedges burnt with the clay soil, and saturated with liquid drainings from the dunghills. This sets the plants free at once, and most splendid crops of turnips are grown. The year's manure is spread over the land in October, and ploughed in. Mr. P. has a contrivance for burying the manure attached to the plough. A very strange circumstance is, that while most of the surrounding land is sick of clover, Mr. Parkinson grows it in great luxuriance.

Mr. Watson, of Walkeringham, is a most intelligent and first-rate agriculturist and breeder, and grows perhaps some of the heaviest crops in the county; with a mind capable of great undertakings, you see nothing but judicious farming. His rotations are very excellent, though they admit of occasional summer fallowing. On this clay approaching near the Trent, it is hardly possible to keep the land in order without them, it being of a stronger character than the red loam. The rotation is—1, turnips, pulled off; 2, wheat; 3, seeds; 4, wheat, manured; 5, fallow; 6, wheat; 7, beans, manured; 8, wheat. The turnips are ridged—manured inside the ridges. Bones are sometimes used, but without very decided advantage. Compost is usually drilled with the turnips.

Perhaps Mr. Watson's bean crops exceed anything in the county; they are sown on ridges twenty-seven inches apart, and horse-hoed three times, and hand-hoed twice. The distance between the drills admits of this being fully carried out; but before harvest the beans spread in such abundant richness that they cover the spaces. On the Trent bank land Mr. W. grows potatoes; manure is procured from the river by boats, and also lime.

Perhaps the most interesting object, however, in the county, as showing the power of human ingenuity, capital, and skill, is the irrigation. Besides the water meadows of the Duke of Newcastle, mentioned by Mr. Lowe, Mr. Sherring, Mr. Ramsden, &c., there are those of the Duke of Portland, Lord Manvers, and Lord Scarborough. For extent, as well as careful execution, strict attention, and a variety of circumstances, those of the Duke of Portland on the river Maun, or Man, stand pre-eminent. Speaking of the limestone and coal district, Mr. Lowe says—"In the coal district intelligent persons doubt whether watering might not be prejudicial to the land from the pernicious quality of the coal and iron with which the waters are impregnated; but a trial of this might be desirable on a small scale" (p. 102).

Almost at the junction of the red sandstone formation with that of the limestone and coal we see most surprisingly what irrigation can effect. The river Man is but a small stream in this district, but it is made to irrigate about 300 acres in the parishes of Mansfield Woodhouse and Clipstone. The stream is cut off at its highest part at Car Bank, and an artificial carrier made for a distance of between six and seven miles. The meadows are so arranged that the water can be let on, taken off, or confined to one or more meadows, without the slightest difficulty. The soil varies considerably near the flood dyke; it is of the lightest and loosest sand, and the fall on this is very considerable. Near the old river it is a deep peaty soil, and evidently has been a quaking bog. A part of the original forest is allowed to remain unimproved; as a sample of what grew before the irrigation was attempted, and the miserable gorse, heather, and moss, which starved rather than grew on its surface, it contrasts most strongly with the rich, luxuriant, and fertile meadows below, laden with rich and abundant produce.

In a dry season, as may be expected, the natural resources of such a river are quite inadequate for the irrigation of so much land. This has been overcome by the making of a large reservoir-lake, seventy-three acres in extent, in the township of Sutton in Ashfield, above Mansfield, which, at its head, is fifty feet deep. The mere was artificially made with clay, and pressed down with broad wheels.

The watering goes on in summer and winter. The water is allowed to remain upon the land about five or six days, according to circumstances, and is let on, about once in six weeks, on land which is being soiled or depastured. A very considerable part of it is removed for soiling in the yards and sheds by cattle, and part of it is mown for hay, and part of

it depastured by horses, cattle, and sheep. No poaching occurs, even by the farm animals, after the irrigation; so completely sound is the low ground and so porous the high. The water is far from thick, though somewhat dusk in appearance—owing, probably, to its being kept both in the reservoir and flood-dyke, almost stagnant; still, except in extraordinary circumstances, it does not contain much suspended matter, and therefore must owe its fertilizing powers principally to the matter held in solution by it. It has a peculiar softness and soapy feel in the fingers. The same observation applies to the water which issues from the drains.

The productiveness of the soil is almost boundless; four, five, and even six crops of grass may be obtained, under favourable circumstances, in the year; and, as the soil never requires any manure, scarcely any estimate can be formed of its value in creating manure for the high parts of the farm; and well managed and cultivated as that is, the value of the meadow forms a striking contrast to the best part of the grass not irrigated, even when all the ordinary appliances of agriculture are liberally afforded. The great benefits of the irrigation were very visibly manifested last season: the dryness of the months of April, May, and part of June was such, that all the lands, however rich in cultivation, were literally dried up by want of moisture, and every artificial means were used to afford food to the half-pining animals. To contrast this with the deep verdant green of the meadows, loaded with flourishing and luxuriant grass, exhibited them in a point of view doubly interesting, because they were, as it were, defying the very seasons to arrest their richness.

It seems to be a settled point, that the meadows with the greatest inclination—say one foot in nine—are the most successful.

The high land seems to derive a much greater advantage than the low land, where the same water is applied. The high land is made of the requisite fall without any difficulty; but the low land must be much altered in form to acquire the necessary fall; and, indeed, throughout the meadow it necessarily has less. The higher land exhibits a much more luxuriant aspect than the low, and hence some disposition arises to give this credit to the fall. It should, however, be borne in mind that the soils are of a decidedly different character; the first being exceedingly porous sand, the latter clayey peat; one readily absorbing and quitting its redundant moisture, the other retaining it very tenaciously. This may make much difference; still it must be conceded that the more freely the water flows over the surface, the greater the benefit.

The preparation of the land for irrigation may be interesting. The river is tapped at a high level, and conveyed by a flood-dyke on the highest part of the ground, flooded for a distance of about 7½ miles; by the sides of these small flood-gates—easily raised or fastened down by the hand—admit the water to one meadow. This, as we have stated, is allowed to remain on about six days, but varies according to the effect produced upon the grass.

In preparing the land, drifting sand at the highest level and peaty morass below, the first point necessary was to obtain the land of one uniform level. This was effected by the spade. Stakes, at 5 yards apart, were placed in the ground, enclosing 25 square yards. This was filled up with earth or pared down, as the case required; attention being paid, as much as possible, to keep the surface soil uppermost, where any soil at all existed. On the bog a very thorough system of deep draining was necessary. This was undoubtedly aided by the thorough tapping of the parent river. A large stone main-drain winds through the low land, into which the deep tile-drains empty themselves. Along the main drain shafts are sunk in various places, which are walled up 3 feet above the surface, and neatly covered over. These enable any workman to descend into the main drain, should any damage occur. The water which drains even from the bog is of the same soft character with the river water on the surface.

Boring, to dry the swamp, has been attempted only in one instance, and his Grace seems somewhat averse to the practice; but then it is doubtful whether it might not have been successfully adopted, especially in the first instance, and prevented a great outlay. Several meadows are still being added, now that the supply of water is sufficient. One has been made during the last year, adjoining the Old Mill-lane leading from Mansfield Woodhouse. Several which had too slight a fall have been altered in form. When prepared, the land is sown with turnips when very poor; or, when otherwise, at once with grass seeds obtained from the banks of the river Dove, in Derbyshire. The grass is sown without any corn; and, as soon as it has acquired a degree of maturity, to consolidate the soil a little by its fibres, the water is let upon it. The effect is very soon visible in its rapid and luxuriant vegetation. There is no doubt but the meadows are annually improving, both as regards herbage and quantity of produce, and also as regards the natural fertility of the soil. Some of the meadows broken up for improvement in form are planted with cabbages for two successive years without any manure, and the produce is wonderful. The dried peat, on some part of the low land, has been carted off to some part of the Duke's high and unirrigated land as manure, and with very good effect. There can be no doubt but the

water still improves the soil; and, should it be taken off permanently, a very rapid deterioration would soon be seen. Even when it is let off necessarily for some months, as in the cases when the grass is mown for hay, and which is more generally done at Edwinstow and Ollerton below, a manifest deficiency occurs, visible even to the most casual passer-by. To be successful, it must be well carried out.

Necessarily connected with all this extraneous produce, contrivances must be made for its consumption. Extensive buildings are therefore erected at Clipstone Park and at Cavendish Lodge, the one nearly at the centre and the other at the extremity of the meadows; and large yards and sheds for soiling, barn, stable, steam-houses, and all the best arranged offices necessary for so great an undertaking, have been erected. The water collected from the buildings is carefully conveyed by spouts into a capacious tank, and is pumped into a cistern, which supplies troughs in every cattle-shed, and also in the fold-yard, at one operation. These can simultaneously be let off; and the water, which at one moment supplies a permanent want, is converted into a stream to cleanse the troughs of every animal. The grass when soiled is of a feeding description, and the cattle luxuriate free from annoyance of every kind. The bullocks are confined in the sheds, the heifers allowed to roam in the yards, both of which are well littered. No reservoir is made for the liquid manure; it is all allowed to return into the all-fertilizing source—the flood-dyke, to be there diluted and returned in the shape of organized grass. A large steam apparatus, but no thrashing machine, is attached to the premises. The manure made by this process is almost immense. It is conveyed to the uplands in his Grace's occupation, and there enriches the soil so much as to render the application of artificial food or artificial manure on this large farm almost unnecessary. Upon about 1,300 acres of land, not £100 per annum is expended in artificial manure.

The whole, whether taken as regards the beauty and accuracy of its execution, the order and skill of its management, or the practical utility to which the water is applied, indicates the greatest care and attention, and reflects the highest credit on his Grace, who conceived, and the Tibbets, who arranged and laid out, and still superintend, the works.

The Clipstone meadows have been dwelt upon because of their extent and perfection; but there are several others in the county. Besides those of the Duke of Newcastle, at Clumber, and the other at Carlton, at Thurgarton, and at Caythorpe, mentioned by Mr. Lowe, the Earl of Scarborough and the Earl Manvers have also land in various places laid out and successfully irrigated; and there is no question but most of the rivers in the county might be successfully applied to the same beneficial purposes.

From this consideration of the benefits derived from the application of water, we come to a very opposite subject—that of drainage. That in the clay districts it is invariably needed, almost universally strikes us at every step. The ridges and furrows, the failing corn in the latter, when contrasted with the level crops of Mr. Parkinson, present a contrast as striking as the irrigated meadows from the sandy upland. But the difficulty of draining land like this, from the gradually undulating character of the soil of Nottinghamshire—the clay district—the streams which carry the water so readily to the Trent, sufficiently capacious for all such purposes—are sufficient inducements to place tile draining within the reach of almost all who have the ordinary capital for carrying on a farm. But what must be done with a swampy morass, hundreds of acres in extent, with no fall, and situated absolutely below the level of the noble Trent, into which, if at all, its waters must be poured? And yet this difficulty has been surmounted in this county. Everton Carr comprises about five thousaud acres of low land, situate in the parishes of Everton, Scraftsworth, Gringley, Misterton, and Walkeringham; and not only had this to be drained, but the waters for perhaps four thousand more acres of the high land, which emptied themselves into the Carr, had to be got rid of. An Act of Parliament was obtained, and commissioners appointed with power to drain the Carr and assess the amount upon the proprietors. A main drain was cut nearly parallel with the river Idle, called the "mother drain;" into this several open drains empty themselves—in all 37 miles of drainage. A steam-engine was erected at a few hundred yards from the Trent, at Misterton Carr, of forty horse-power, which elevated the water 11 feet. Flood-gates were erected at the junction of the drain with the river, and also at the engines, the space between being a kind of reservoir for the water when pumped.

The operations, however, had an extraordinary effect; they absolutely caused the Carrs, which were very porous bog earth, to sink as the water was abstracted; and the floods of 1829 caused very serious damage to be sustained. It became evident not only that another engine of equal power with the former must be erected, but either the original drains must be deepened or a new one cut. As the expense had been considerable, many of the proprietors objected to a new drain. Mr. Watson, of Walkeringham, who from the first saw the utter inutility of taking the waters from the subsided surface by the original drain, especially as from

the low parts it had a circuitous route of upwards of four miles, strongly urged the cutting of a tunnel drain through the higher parts of the Carr, to bring the waters by a rapid and direct fall to the engines. The commissioners began evidently to lean to Mr. Watson's judicious plan, which he took great pains, by circular and published letters, to carry; and backed out by an engineer who was consulted (Mr. Leather), it was ultimately carried. The drainage is now complete. Two forty-horse power engines, which are capable of lifting 200 tons of water per minute, and which are very efficiently superintended and managed by Mr. Ellis, effectually complete the work.

The water is kept about three feet below the surface; and were it lower, there is little doubt but still greater subsidence would take place; nor is there any that, if the works were neglected for a few months, the water would again raise the soil. The bog now produces most splendid crops of turnips and corn; the turnips and seeds are consumed upon the ground by sheep and cattle, which are in a very thriving state. Barley is scarcely successful upon it. The course pursued on the Carr is turnips, drilled in ridges, with dung and bones; wheat; seeds, consisting of Timothy-grass, cocksfoot, rye-grass, rib-grass, and trefoil; clover is not successful upon it—a very full and useful herbage, however, is secured. After the seeds the land is sown with oats, which it grows luxuriantly. Mr. Watson, who occupies a portion of the Carr, farms it admirably, and produces splendid crops.

Sowerby, Thirsk, Dec. 1, 1847.

(To be concluded in our next.)

CLAY BURNING.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

It is certain that the practice of clay burning has long been gradually increasing on the heavy clay soils of various portions of England. It is a mode of providing the land with a fertilizing dressing, which possesses one or two peculiar advantages. It not only changes or renders more available for the farmer's growing crops some of the chemical ingredients of the soil; but when the dressing is copious, the other ingredients of the clay, which do not serve as food for the plants to any material extent, still operate very beneficially by rendering the soil less adhesive and permeable by the atmosphere.

There is, moreover, the general advantage alluded to by Mr. John Pierson, a practical farmer, of Framlingham, in his excellent paper (*Jour. Roy. Agri. Soc.* vol. viii. p. 78), where he observes, when speaking of clay burning:—"I will here mention that I often sift and store up a few loads of the best blackened earth to drill with my turnips, instead of buying artificial manure, and find it answers remarkably well, and assists in maintaining the position that a heavy-land farm in Suffolk can be farmed in the first-rate style without foreign ingredients."

It will aid the occupiers of the clay soils, which are adapted for burning into ashes, if I follow in this paper a few of the recent chemical researches, which tend to explain the *chemistry* of the operation.

In the choice of the clay proposed to be burnt, it is always useful to consider if a more profitable variety may not be selected than that which constitutes the surface soil; and it will be well to remember that the composition of the surface clay, and the clay on which the soil immediately rests, is often very different in composition. For instance, an apparently uniform clay being analyzed by Professor Phillips (*Jour. Roy. Agri. Soc.*, vol. vii., p. 258), was found to contain—

	At 22 in.	At 54 in.
Silica	59·0	72·9
Alumina	23·5	13·4
Peroxide of iron	8·1	6·6
Carbonate of lime	1·0	0·8
Water, sulphate of lime, &c.	4·8	5·5
Carbonate of magnesia	0·0	9·8

The common practice, however, both in Suffolk and Essex, is to burn the surface clods in the way which is thus described by Mr. Pierson, as that of the farmers of the former county:—

"The manner of doing it is to plough a piece of land in the spring of the year, or plough back a piece of wheat-stubble that has been ploughed once during the autumn, or the first ploughing after tares, or a pea or bean subble; but there is seldom time in the autumn for this last. I mention ploughing back a wheat stubble, for if previously ploughed, and exposed to the frosts of winter, it will become too pulverized for clod burning. Having ploughed it, you roll and harrow in dry weather, till the majority of the clods are about the size of a large walnut—there is nothing so good as the clod-crusher to forward this operation. When perfectly dry collect them into rows, about six yards apart, with iron-teethed rakes; take a quarter of a whin-

faggot or less, according to size, previously cut into lengths by a man with an axe; place these pieces about four yards apart in the rows, cover them with clods, putting the finest mould at the top of the heap to prevent the fire too quickly escaping. Observe the wind, and leave an opening accordingly. Having set fire to a long branch of whin, run from opening to opening till two or three rows are lighted. Secure these, and then put fire to others; keeping a man or two behind to attend to the fires, and earthing up till the quantity desired may be burnt, which will generally take four or five hours—say, from 25 to 35 loads per acre, of 30 bushels per load. This work is often put out to a gang of men at about 10s. per acre for labour, and the whins cost 4s. 6d. per acre, not including the carting. When the heaps are cool, spread and plough in. The great advantage of burning clods in these small heaps in preference to a large one," he continues, "is the saving of expense in collecting and spreading; there is much less *red* brick earth, and *more black and charred;* no horses or carts moving on the land while burning, and a large field may be all burned in a day or two, therefore less liable to be delayed by wet weather. In the heavy land part of Suffolk the farmers purchase whins from the light land occupiers, and often cart them a distance of fourteen or sixteen miles when there is no work pressing on the farm. These are stacked up, and secured by thatching with straw, that they may be dry and fit for use when required. Bean straw is the next best fuel to whins or furze; and it is astonishing," concludes Mr. Pierson, "to see how small a quantity will burn the clods, if they are of a proper size and dry." The reader will note that the ashes which are *black* and only charred are preferred by the Suffolk farmers, to those which are red from being exposed to a greater and more continued heat. This, we may suppose, in a great measure, arises from the larger proportion of charcoal remaining in the darker coloured ashes. It is pretty certain that one valuable ingredient in the ashes thus preferred is the carbon; and as it has been remarked in another place (*Johnson and Shaw's Farmers' Almanac*, 1848, *p.* 35), the proportion of charcoal in this way added to a soil is very considerable, and this is derived not only from the organic matters of the clay, but from the combustibles employed. 100 parts of the ashes from a stiff loamish clay soil were found, by Davy, to contain—

Charcoal	8 parts
Common and other salts	2 ,,
Oxide of iron	7 ,,
Chalk	2 ,,
Clay and sand	81 ,,

Supposing, therefore, that 50 tons per acre of these ashes are applied (a quantity often much exceeded), we from this analysis perceive that the farmer must often dress his land (in the ashes) with about four tons of charcoal per acre. The expense of preparing these kinds of ashes, per 100 loads, has been thus estimated by a veteran clay burner, Mr. Poppy, of Witnesham, in Suffolk—

	£	s.	d.
Labour—digging and burning, at 9d. per load	3	15	0
Filling, 1s. 6d. per score, 7s. 6d.; carting, three horses and two carts, 16s.	1	3	6
Filling and spreading, after burning	0	15	0
Carting, and laying out over two acres	0	16	0

Being £6 9s. 6d. per 100 loads, or £3 4s. 9d. per acre, allowing 50 loads to each. This, from the mode employed, is evidently a more expensive process than that adopted by Mr. Pierson. The furze employed by the Suffolk farmer yields not only a portion of carbon in the clay ashes, but almost all its mineral ingredients, and the same remark applies to the other combustible substances commonly used by the burner. The furze plant is composed, per cent., according to the analysis of Professor Johnston (*Trans. High. Soc.*, 1847, *p.* 587)—

Water	77.40
Organic matter	21.23
Ash	1.37

The ash, or inorganic portion of these specimens examined by this chemist, contained in 100 parts—

Potash	18.31
Soda	7.54
Common salt	12.23
Lime	16.02
Magnesia	6.79
Phosphate of lime and magnesia, and a little phosphate of iron	26.74
Sulphuric acid	6.79
Silica	5.58

The different compositions of the clay, and of the fuel employed, will naturally vary that of the clay ashes produced, but I think that the above examination will show the farmer the true objects to be aimed at in clay burning; still, however, every one will feel the force of Mr. Rowlandson's observations in his prize essay "On burning land for manure" (*Jour. Roy. Ag. Soc., vol.* viii., *p.* 49), when he says—"As soils vary so much in respect to their capacity for burning for manure, it cannot be imagined that rules can be here laid down for every case; in fact, unless a farmer knows from experience the proper formation of heaps for burning adapted to the soil of his farm, it will be much better for him to make a few experiments on a small scale rather than depend upon any written or oral description."

Clay-burning seems to answer equally well on the Suffolk clays as in those of the London basin clays of Essex. Mr. Long, too, has succeeded

equally well in Hampshire, and upon the "very heavy Oxford clay land." Mr. Pusey has given the result of a trial with clay ashes. In this case a field of eight acres was selected, and the following was the result per acre of the comparative trials with a wheat crop (*Jour. Roy. Ag. Soc.*, vol. vi., p. 478)—

The soil simple produced	. .	37¾ bushels
,, dressed with 80 cubic yards of burnt clay	.	45½ ,,
,, dressed with 83 yards of burnt clay, and sheep-folded	. .	47½ ,,

These examinations will serve in more ways than one to assure us that the process of clay burning is attended with more advantages than is generally believed by the owners of very stiff clay soils; they afford another instance of the advantages of a thorough understanding of the chemical operations going forward even in a heap of clay which the farmer is burning in his fields, and it may serve, while it tends to extend the profitable operation of the practice, to guard us against hasty conclusions in any of the difficult processes of agriculture.

STALL-FEEDING.

BY J. TOWERS, MEMBER OF ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

SIR,—My attention has been directed to this subject by the perusal of an excellent letter, addressed by the Rev. George Wilkins to the editor of the *Agricultural Gazette*, which appeared Dec. 4th, in the third column, page 803 of that paper, No. 49. It referred to a correspondent, R. B. D., who had written "*On the proper plan of building Sheds for Cattle.*" Mr. Wilkins, with the best feelings of a merciful and kind man, expresses himself with his wonted zeal and energy; and as I go every inch with him, on *chemical* grounds also, I have been the more gratified by meeting with the *Lecture on the Diseases of Cattle*, before the London Farmers' Club, October 4, that has just come before me, and which fully justifies all that Mr. Wilkins has advanced. That gentleman first glances at the theory of the radical exudation of plants—a doctrine which, though it bears only in the second degree upon the true principles of stall-feeding, is very important when applied to those of general agriculture; so much so, that I shall feel it a duty to revive a theory that has never yet been duly investigated. But setting aside digression, it is time to come at once to the subject to which Mr. Wilkins has directed his chief attention. A plan had been proposed to erect "loose boxes" and others, with cesspool or tank below each, "covered with an open flooring of boards." "The excrements of all kinds of animals are made offensive to them by an obviously wise provision. In building his cattle-sheds, therefore, I would earnestly impress upon the attention of R. B. D. to have this law constantly before his mind, and, above all things, to have regard to perfect sweetness and cleanliness." The loose boxes referred to are thus described:—"A deep pit or excavation is made in each box: a beast is then driven into it, and there he is fed and littered, until, with the dung, and straw saturated with urine, the sunken space is completely filled, so that the animal is enabled to walk out of the box."

Really, one would imagine that the person who contrived, and then could recommend, such a living grave as an improvement, could never have seen or entered, much less have been the tenant of a close stable for one quarter of an hour during his whole life! What must have been his notions of a heating dunghill, replete with urinous matter, ever in a state of strong and renewed fermentation; and of the consequent development of ammonia, and of poisonous hydro-carbonated gases? The very idea is redolent of disease and death. Well may Mr. Wilkins, in his zeal, exclaim against a contrivance by which an ox or cow shall be "imprisoned like a felon in an impure cell, eating, drinking, and sleeping among his own excrements," from which gases are expelled that are repugnant to his every sense, and which his nature abhors. Again—"But bad as are such loose boxes for cattle, they are sweet homes in comparison with the newly recommended *sheds* for sheep and pigs, wherein the dung-pits are covered over with *open* boards, and the poor beasts are made to lie on them without straw. I lately inspected one of these sheep-sheds. Though the weather was fine, the wool of the poor animals was wet and dirty from the urine and dung sticking on the boards on which they lay; and when I entered the dirty slippery place, a smell from the gases, by the active fermentation of the dung and urine in the pit below, arose offensively, and made me quickly seek an *exit*."

Such are the prominent portions of Mr. Wilkins's appeal to the tender mercies of his agricultural brethren; and I deem them to be most worthy of serious reflection. I am not sufficiently instructed by practice to enter upon the subject of extensive stall-feeding; but one fact of the domestic homestead taught me that, by sinking a large barrel into

the ground of a very airy shed, wherein the urine of a milch cow was received from a drain that conducted into it the drainage of the paved floor, so great was the development of ammonia, that upon attempting to neutralize it by sulphuric acid, a volume of noxious sulphuretted-hydrogen, and other offensive gases, was instantly liberated, which rendered it difficult to remain near the vessel. The ammonia, it is true, became fixed as a sulphate—but that was all: the atmosphere of the shed was poisoned to a certain extent, and hence I object *in toto* to the introduction of underground recipients of liquid drainage in all sheds tenanted by animals.

It would be unfair to trespass upon the highly interesting *Lecture on the Diseases of Cattle*, &c., &c., recorded in the *Farmer's Magazine* of last November, pp. 408-421. It must therefore suffice to refer the reader particularly to the authority of Mr. Percivall, adduced by Mr. Cherry, (see 413-14), in order to show the disastrous consequences attendant upon *defective ventilation*, by which the effluvium from the urine and dung of the animals is so confined, as to render the atmosphere of close byres and stables extremely noxious. Mr. Percivall's arguments for the perfect cleansing of all stables by chemical agents, were met by some on the ground that the proper use of straw was quite sufficient to obviate any mischief which could arise from putrefactive fermentation. Thus Mr. Wood avouched his belief that "good straw answers the purpose quite as well as any chemical composition, if a sufficient quantity of it be applied;"—adding, however, "With regard to ventilation, I am quite convinced that it must be conducive to health."

It must be confessed, however, that so far as concerns *the epidemic* of late years, and the *pneumonia*, which have for a long time proved very fatal, neither one nor the other can be legitimately ascribed to hydro-ammoniacal exhalations arising from putrefying excretions, even in the worst-ventilated offices, since it is perfectly certain that those nuisances have abounded in excess time out of mind, without any corresponding *epidemic* results. Here we find ourselves involved in doubt and perplexity; and just as in the fatal malady of the potato, the range of the mind appears to become contracted; we lose sight of the past, and forgetting that similar causes have wholly failed to produce any corresponding effects, we argue in a hypothetical circle, and arrive at "conclusions wherein nothing is concluded." Really, and in truth, we know nothing of causes of epidemic or infections; but as foul drains, foul and dirty cesspools, or recipients of fæcal matters are a disgraceful abomination, every such nuisance ought to be removed and obviated. The nation and individuals ought to reciprocate in a duty, the performance of which, to say the least of it, would promote the general health and comfort of men and animals.

Among the multitude of plans suggested to effect the economy of manure for the farm, none has, to me, appeared so available as the one adopted by Mr. Mechi, at Tiptree: it combines also the greatest cleanliness in all the departments; therefore it will be just to cite his own description as I find it in Letter V., page 11:—

"All the drains—except the roof-drains—terminate in the manure-tank; so that not a pint of water that falls directly upon the yards ever escapes except into the tank. All the water that falls on the roof is conveyed through pipes to the brook. The sheep-yards, the bullock and horse stables, are all paved smooth with hard yellow brick, set in cement, so that no liquid manure is wasted. The straw, for litter, being *cut into chaff*, is applied where required without waste. The manure-tank is bricked and set in cement. We put into it the solid manure as it is made, turning the moist bottom upon the top as occasion requires, to prevent too violent a degree of fermentation, and adding occasionally sulphuric acid in water, especially in the summer months, or an occasional layer of earth. In winter we have always sufficient moisture in the tank. As we pump out the liquid-manure from the well, which is three feet deeper than the tank (by which term Mr. M. evidently intends to express a recipient of the solid matters from which filtrate all the redundant moisture that they contain) no solid manure can enter, there being proper gratings to prevent it. In the winter, when we have a superabundance of moisture, we pump the liquid manure into Crosskill's liquid manure-cart, which holds 200 gallons, and apply it to the pastures, young wheat, or fallows, first fixing the ammonia, if in a state of fermentation, where required, with sulphuric acid. The piggeries, paved with flag-stones, discharge their moisture into the manure-well."

"I do not like," observes Mr. Mechi, "the usual custom of giving manure-water to horses and cattle instead of to the land. I presume they are, like ourselves, all the better for drinking pure water instead of stinking compounds." Nothing can be more rational; yet it cannot be denied—the experience of time proves the fact beyond a doubt—that horses, at all events, prefer a weedy or slightly turbid roadside pond, to the finest running spring that the country can produce. But this, after all, is a widely different thing from the filthy carbo-ammoniacal compounds that flow from the dunghill.

Mr. Nesbit meets the subject thus. He declares that the practice of allowing animals to drink the liquids which flow from dunghills is to be repu-

diated, as being "a certain means of poisoning them," adding, "By introducing vegetable, and it might be, animal matters, in a state of decomposition, they could not do otherwise than cause injurious effects. Now it was true that the animal often drank dirty water in preference to clean; but this was not because of the dark appearance produced by vegetable decomposition, but because of the saline properties which such water contained—properties which could be given to pure water by putting a piece of rock-salt into it, and then the animal would prefer the clean water to the dirty?"

The grand object of every farmer and grazier should be to keep his stock in the best condition of HEALTH. Once let him discover the means of so doing by the regulation of diet, drink, and protection by day and night, and he could rest assured that he has done all within the power of man to ward off diseases. We hear much of atmospheric epidemics, and doubtless the electro-magnetic agencies may produce decisive effects. But every kind of weather and every species of atmospheric disturbance have occurred from time to time, without any marked epidemical result. Again, it is certain that, as in the influenza, millions escape, so in the diseases of animals *the existing condition of the body* renders it susceptible of, or enables it to resist certain impressions. As, then, we neither are aware of, nor can control invisible agents, all we can do is to exert the utmost caution in regard to everything which may promote and sustain a pure, not a high, state of health. The former premises tranquillity of all the vital functions; the latter approaches to disease, inasmuch as it exposes the body to inflammatory action.

Dec. 10.

ON REARING AND FEEDING CALVES.

(*Abridged from the German.*)

Having had 34 years' experience in rearing calves, I hope you will excuse the liberty I take in sending you the following account of my practice; especially as I have found my method so much better than allowing the calves to suck their mothers. Whether the animals were intended for *keepers* or *feeders*, I have always found that my method brings them soonest to perfection. It is shortly this:—

1. For the first week the calf receives daily six quarts of new milk, as warm as it comes from the cow, in three portions—at morning, noon, and night. I carefully adhere to these three times of feeding for the first 12 weeks.

2. In the second week the milk is increased by half-a-pint at each feeding time; so that the calf receives, according to its strength, not less than 6¾ to 7 quarts per day.

3. In the third week the calf no longer receives new milk, but the milk of the previous day skimmed; always taking care to warm the milk slightly, and at the same time increasing the quantity, so that the daily ration is now 7½ quarts. I also commence at this time to introduce into the drink small portions of boiled linseed, or linseed meal, and crushed peas.

4. I proceed in the same manner in the fourth, fifth and sixth weeks, except that the milk is increased each week by half-a-pint at every feeding time, so that in the fourth week the calf receives 8¼, in the fifth 9, and in the sixth 9¾ quarts of milk daily; the animals also receiving more and more linseed-meal, crushed peas, or rye-meal in their drinks, which are always luke-warm.

5. In the next six weeks I give them their food cold—with, however, more of these mixtures; the latter are always increased with the quantity of the milk, because too much liquid food is very apt to make the calves poor and pot-bellied. During this period I also take from them a portion of their milk, adding in its place such a portion of the linseed or other substances mixed with warm water, as still to make the total quantity of each day's drink (increased as I have said before by half-a-pint at each meal) in the seventh week 10½ quarts, and in the twelfth week 14¼ quarts per day.

6. Whoever pays proper attention to the feeding of his cattle will soon discover whether the proportion of food named be sufficiently rich or not, and can easily add or diminish the proper quantity.

7. There can be no animal so stupid about its food as the calf; it must therefore be taught from its earliest infancy. For this purpose, in teaching them to take their food when mixed with the linseed meal &c., we generally begin by giving a small handful of oatmeal, and placing within their reach some good hay, or, if the season will afford it, some green food.

8. When the calves are twelve weeks old, the milk is entirely taken from them, and they receive in its place ryemeal or crushed peas, made into pulp with water, and then thinned; the daily ration being increased until the end of the second quarter from 14½ to 20 quarts.

9. When the calves are half year old the drinking food is gradually lessened and thinned; the quantity being regulated by the natural thirst of the animals, as it gradually takes on to more substantial food.

10. The following is the statement of the expense of bringing up a calf until one year old:—

1. The first 14 days, 91 quarts of good milk.
2. From the second to the sixth week, 242 quarts of skimmed milk (12 hours old).
3. From the seventh to the twelfth week, 252 quarts of very poor milk (24 hours old.)
4. Half cwt. of linseed meal.
5. Three bushels of crushed peas.
6. two bushels of rye meal.
7. Hay, oats, green food &c.

Total expense of these in Germany — £3 sterling.

C. E. D.

BURTON FARMERS' CLUB.

REPORT OF THE COMMITTEE TO THE GENERAL MEETING HELD 18TH NOVEMBER.

In presenting to the members of the club this seventh annual report of its state and proceedings, the committee have again the pleasant office of congratulating them on its continued prosperity and usefulness.

Adhering to the judicious resolve not to expend any part of the funds except in uses whereby the objects of the club are really advanced, they have chiefly confined the expenses of the past year to the sum needed for the monthly meetings, and for the exhibition of samples of produce. By this prudent economy there still remains on hand a balance of £6 15s. 1d., although the subscription of the past year was only 1s. for each member. It is recommended that the subscription for the coming year shall be 2s. 6d., which will supply the means of meeting the estimates for the proposed expenses.

Several new members have been admitted, and the total number on the books is now about one hundred.

But few additions have been made to the library beyond the periodical publications which are regularly taken in.

The committee think that the thanks of the club are due to many members who have exerted themselves to give increased interest to the monthly discussions. These exertions, they are happy to say, have not been without success. At every meeting a subject of much practical importance has been opened, and in the papers presented and read, and in the succeeding discussions, though perhaps not much novelty has appeared, yet, what is better than novelty, the ascertained results of science, and the practical maxims of the art of agriculture, which a cautious experience has approved, have been ably urged by many members and sanctioned by the authority of the club. They are happy to add also, that the attendance of members has been more numerous than in any former year, and especially it is a duty in the committee to record the assiduous attention of the President, W. Worthington, Esq., to the discussions, as also to every matter which affects the well-being of the society.

The committee feel a strong assurance that in many ways the discussions of the club have been, and will still continue more and more to be, productive of very beneficial effects. They have been conducted with so much candour and moderation, that, whereas it was once thought dangerous to raise debates on those matters which relate to the interests of the farmer or those of the landowner, it is now confessed that much good may be done by the open interchange of opinion on such questions. So also the idle fear, lest the landowners should be assisted to more knowledge of the farmer's business than was good, is no longer felt. As regards the effect of the club in actually influencing the opinions on points of practice, they speak still more confidently. By the publication of the reports of their meetings they are extensively read, and the discussion does but begin in the club room; it is repeated, again and again, at market tables and parish meetings, and at the home fireside; and it is impossible but that practice, wherever it is defective, must gradually be improved by the juster views elicited in such debates.

As the reports have already been read by most of the members, it will be unnecessary to take up the time of the club in repeating more than the main features of them, and of the resolutions of the club.

At the meeting in December, Mr. Hollier treated the question, how best to repair land exhausted by over-cropping. He argued that land was exhausted by the abstraction of the constituents of plants, carried away in the grain or other crops. The reparation must be effected by increasing these

deficient materials, and might be done by growing green or root crops, or letting land lie in grass, or by the addition of manure at once. He insisted that the last method was the speediest and most economical, and that where straw, hay, &c., had been conveyed away, farm-yard manure was the remedy; but that where grain only had been grown too much, a manure like bones or guano, which contained phosphates and ammonia, was an efficient restorative, and by far the cheapest. These opinions were approved.

In January the subject of the "diseases of cattle and sheep" was brought forward by Mr. Lyon. He confined his remarks chiefly to the causes of disease, and to the means within the reach of the farmer of preventing them, by judicious attention to shelter, pure air, and wholesome food. Especially he drew attention to the important fact that the severe disease which required medical treatment was not that which was most injurious to the farmer's interests, but those slighter forms of deranged health which merely prevented cattle from thriving, or milking, or laying on fat; and which could only be prevented by his own care and vigilance. The club approved his remarks; but what is of more weight, they received the sanction of Mr. Robinson, who at this meeting gave much excellent counsel as to the management of the epidemic, pleuro-pneumonia.

In February Mr. Wagstaff's paper on agricultural implements was read. He discussed the interesting question, whether one-horse carts are at once more convenient and more economical for the general work of the farm than waggons. He contended that carts were, first, less costly; secondly, that more work could be done in a given time with fewer horses; and thirdly, that all work was more conveniently done with them. These opinions, which seem to be gaining ground among farmers, were approved by the majority of the club.

In March Mr. Bernays delivered to the club a lecture on the constituents of plants, organic and inorganic. It need scarce be said that his exposition of the subject was clear and instructive. Subsequently, he was induced, at the instance of the club, to give a course of five lectures on the chemistry of agriculture. These lectures the committee rejoice to say were well attended, and the club has thus been instrumental in diffusing the taste for, and knowledge of, a science which must now be accounted the only safe and sufficient ground-work of a practical farmer's education.

At the meeting in April, Mr. Lathbury introduced the subject of the "rearing neat cattle." He expressed an opinion that the practice of breeding in-and-in was faulty, when it was the intention to procure good milking as well as feeding stock. By such means early maturity was gained, but at the expense of a vigorous constitution in the animal. He thought that continued good rearing and good choice of parents was the only safe rule to observe, and that a good milking stock was thus attainable with excellent feeding properties. He advocated a liberal plan of rearing, because young stock gave a greater proportional profit for good and sufficient food, and because the future profit of a milking or feeding beast depended altogether on its having been well treated in its youth. Mr. Lathbury gave new milk for a fortnight, afterwards skim milk and whey with meal, and weaned his calves at eight weeks; and he advised the best grass during the summer, and a liberal allowance of turnips and hay in winter, or corn with their straw. Some members advised new milk for a longer period, and it was unanimously agreed that young cattle should never be treated so as to lose their condition from their youth to maturity.

In May Mr. Ordishe read a paper on the best mode of cultivating a light soil, in which he recommended the common four-course Norfolk system, with an intermediate crop of rye before swedes, and tares before white turnips. The crops of the course he recommended were, first, wheat on the pressed clover ley; second, rye followed by swedes, or tares by white turnips; third, barley; fourth, clover or Italian rye grass. These crops, he argued, were admirably suited by their habits and by their different mineral constituents, to follow each other in rotation. He thought that by no other course could the same advantages be attained as the one ploughing and pressing for the wheat crop, and the clover crop every fourth year gave two crops out of four with almost no tillage. It was therefore he preferred it to a longer course; and he preferred it to one in which the clover or grass ley lay down more than one year, because after the first year the land was not so much improved by the increase of roots in it, and was also apt to become foul with weeds. He detailed his management of each crop in his paper, filled with the justest views on the most important points of practice, and his system received the cordial approbation of the club.

In June Mr. Harding proposed the plan of growing a wide-rowed crop of beans as a cleaning crop, instead of a dead fallow. He advised two rows of beans at nine inches apart, and a yard between these rows to give room for a deep and continued use of horse-hoeing. It was generally agreed that such a system was better than dead fallows on much heavy land, though opinions were expressed that a vetch fallow was perhaps a better system.

At the September meeting Mr. Colvile read a very able essay on the impediments to improvement in agriculture, in which he shewed that the impediments were mainly five; viz., 1st, The insecurity of tenure, and consequent deficiency of capital; 2nd, The want of skill in the farmer; 3rd, and in the labourer; 4th, The existence of small farms; 5th, The injury caused by game. The main object of his paper was to advocate the expediency, and propose a plan, of securing to the tenant compensation for unexhausted improvements. The want of such security was, in his estimation, the great hindrance to good farming, and the remedy was in the hands of the landowner. He was averse to any legislative interference with the arrangement between landlord and tenant, but would leave it wholly to the discretion of the parties themselves. The plan of tenancy proposed by him was that an agreement should be entered into, by which a tenant should be secured in his farm at a fixed rent for a period of six years, and should on quitting be entitled to compensation for a fair proportion of manures added to the land for which he had not reaped a corresponding benefit; or, as this plan might be objected to, on account of its throwing on the incoming tenant a large investment of capital in unexhausted improvements, he proposed as a substitute a long lease held at a corn rent. He proposed also remedies for the remaining impediments. The club agreed that security to the tenant for unexhausted improvements and for continued tenure was expedient, but without expressing an opinion on the question whether a change in the state of the law was required. On a former occasion the club resolved that a legislative measure was expedient. The general opinion of agriculturists seems to be that as the customs of the country which now profess to give an interest to the tenant in whatever he has done to benefit the land for the succeeding tenant and not for himself, are, through the great change in the system and science of farming, become wholly inadequate to fulfil their intent, it is plainly and obviously just that they should be amended and made conformable to the altered circumstances which time has created. The committee cordially acquiesced in this general opinion.

At the meeting of last month, Mr. Hopkins detailed a plan of cultivating a strong land farm. It consisted in a five-course shift, having 1st, oats; 2nd, wheat; 3rd, fallow; 4th, wheat; 5th, clover, as the rotation on very heavy land after two or more years' grass; and, 1st, wheat; 2nd, drilled beans, or vetches, or turnips; 3rd, wheat; 4th, clover; 5th, clover. He thought it impossible to dispense wholly with fallows on very tenacious land, but insisted that draining should be always practised, which would render them less necessary and always effectual. But on all soils which were at all clean, and capable of bearing green crops or roots, he would grow them instead of fallows. He advised a dressing of guano, to increase the condition of at least one crop in the course. He also advised a liberal use of guano on the grass land of the farm. He had himself so applied it, and he had found its effects unfailing. By such means, and by consuming the straw of the crops, with an admixture of oil-cake or corn, the value and quantity of the manure would be increased, and the land kept in good heart, under the course proposed by him, which he confessed to fall short of the proportion of green crops or roots necessary to effect that indispensable object without such aid. His system was generally approved by the club.

Notwithstanding this favourable report of the exertions of the past season, the committee feel that it is doubtful whether the most assiduous and zealous members would renew them in another. They therefore think it would be well for the club to require less effort on the part of its most industrious supporters. It has been suggested that the meetings should be less frequent; and as there would then be less difficulty in engaging members to prepare the material of useful discussion, and as it may reasonably be expected that a larger attendance, and consequently more animated debates, would attend the change, the committee venture to recommend that there should only be four meetings in the coming year (exclusive of the annual dinner, or inclusive, as may be judged expedient.) The committee feel a strong hope that many members will be tempted to forego other engagements, and assist in rendering the meetings more interesting and useful.

At the present time, when everything respecting public health is engaging so much attention, perhaps the following statements, by a celebrated chemist, may not be uninteresting: "A healthy man will pass about 10 cubic yards of air through his lungs in 24 hours. But there cannot be a greater error than to suppose that a man could possibly exist, if so situated as not to be able to procure any more than this quantity of air. If we imagine a number of men placed in a room where each had only 10 cubic yards of air, instead of breathing there comfortably for 24 hours, symptoms of asphyxia would soon show themselves, and death put a period to their sufferings long before that time could elapse. *This shows the necessity of ventilating our dwellings.* Numerous experiments have convinced me that a healthy man will require *not less than 6 cubic yards of fresh air per hour.* Suppose then we pass 9 hours in our bed-chamber; in order to render it perfectly healthy it should not contain less than 60 cubic yards for each individual sleeping in it; or, in other words, 4 yards square by 10 feet high. How seldom these conditions are fulfilled!"—*(From the French.)* If there be any truth in the above statement, can we wonder at the fever and sickness in the close streets, crowded workshops, and miserable dwellings of the poor?—(Translator.)—C. E. D.

EFFORTS OF AN IRISH LANDLORD TO IMPROVE HIS PROPERTY.

BY THOMAS SULLIVAN.

Irish landlords, as a class, have been frequently and strongly censured for the neglect of those duties which the possession of property entails upon them; and it is undeniable that many, very many, of them have justly incurred the charge of culpable neglect of duty—duty to the tenantry from whom they derive their incomes, and duty to the community of which they are members; but it is equally unquestionable that in many parts of Ireland the landlords who are most distinguished for their activity and zeal in introducing improvements among their tenantry have experienced a degree of disappointment, and even opposition, calculated to dishearten the most sanguine. Agricultural and social improvement is really of slow growth in the remote districts of Ireland. To be ultimately successful, the improving landlord must be endowed with no ordinary share of patience and perseverance. Improved modes of husbandry, because *new*, are regarded with aversion and distrust, and the authority of a landlord over tenants-at-will is often unable to induce even a trial. The difficulties and opposition encountered in introducing agricultural improvements into certain districts in Ireland have been well exemplified on the estate of David J. Wilson, Esq., of Belvoir, in the county of Clare, whose laudable perseverance and enlightened efforts are deserving of the highest praise. Having recently had an opportunity of satisfying myself by personal observation of the good results of Mr. Wilson's method of improving his property, I conceive that an account of the means adopted by him, and the difficulties he had to surmount, may prove interesting at a time when the condition of Ireland is attracting universal attention. The following details are extracted partly from documents kindly placed at my disposal by Mr. Wilson, and partly from his evidence before the Land Commission, under the presidency of Lord Devon.

In consequence of the wet and unpropitious seasons of 1838, 1839, 1840, and 1841, the condition of the tenantry in 1842 was deplorable. In 1843 there were on five townlands in the estate seventeen tenants without a cow, several even without a pig; their houses, from short crops of straw, unthatched, fast going to decay; and numbers heavily in debt, from *time bargains*. In short, the greater number were reduced to a state of the greatest destitution. "I saw," says Mr. Wilson, "there was nothing to save them from ruin, but to make a bold and determined effort to compel them to adopt a better system of cultivating their lands, and fully prepared to meet great difficulties, but never contemplating those which have on every side beset me. One of the greatest errors of cottiers being that of having more land in cultivation than they can sufficiently manure or properly till, I required that no more grass land should be broken up until that already in tillage had been subsoiled and drained where draining was requisite. I required that no fences should be made until regularly laid out by the agriculturist, no drains opened or pasture-land broken up until marked off by him; that potatoes and corn should be tilled on the ridge-and-furrow plan, to enable occupiers to subsoil; and that *two white crops should not be grown in succession*. Most of my land being out of lease in 1843, I required those intending to remain my tenants to comply with the foregoing terms. I attached to the Belvoir National School three-and-a-half statute acres of land, rent-free, for the use of the master, on which the boys are instructed in agriculture. I made experiments in subsoiling and cultivating the land in my own hands; and having succeeded in raising crops far beyond my most sanguine expectations, I required my tenants (they having been continually witnessing the experiments and the results) to follow a similar mode of cultivation."

Mr. Wilson had an agriculturist continually employed in going through the tenantry, laying out drains, and giving advice and instruction. He circulated cheap tracts on farming and housefeeding, gave premiums for the cleanest and best crops, and made it a rule to allow for every description of improvement, whether to houses or land. He had a person from the Belfast Flax Society for months in his house, to instruct in the sowing and management of flax. Guano, grassseeds, and oatmeal were given at first cost, with time for payment till the harvest came in. Home timber of every description was given gratis.

Such are the means that have been adopted by Mr. Wilson in the improvement of his property. We shall now advert to the results; but before proceeding further, it is proper to notice the mode of subsoiling which was practised. Mr. Wilson strongly recommends the following mode of tillage to all small farmers who have to deal either with a cold, wet soil, not yet drained, or a dry soil which

may have become exhausted by constant cropping and shallow ploughing; he has practised it himself with complete success:—

The ground is marked out to be tilled in ridges four feet wide and furrows two feet wide. The parts lined off for the furrows are then dug out, laying on the ridges all the active soil which could be taken up with the spade. The oat-seed is then sown, and covered with the earth which had remained in the furrows, and which were for this purpose cleanly shovelled. By this mode were obtained a dry seed-bed in moist ground, a fresh active soil in exhausted ground, and a depth of surface in light land. The increased return in the crops far more than repays for any little additional labour, or loss in extent of surface; at least, Mr. Wilson found it so, for he states that his crops thus tilled were pronounced by a number of competent judges to be extraordinary, considering the description of land which produced them and the circumstances under which they were grown—in one instance, on a cold, retentive soil, not drained, where there had been a very poor crop of potatoes the previous year, and the soil not stirred from the time the potatoes had been dug out until the oats were sown. In the other case, a second crop of oats was taken off the same field, the stubbles having been ploughed in October. This crop was much superior to the former; it produced fine grain, and was so luxuriant that the greater part of it was lodged a few days previous to the reaping, which was on the 9th of August. Should the surface or active soil be very shallow, the breadth of the ridge may be narrowed, or the breadth of the furrow increased. The wide furrows allow of loosening the subsoil either with crow-bars, picks, or spades; and all stones met with are carefully reserved for drains, where draining is necessary. The drains are directed down the greatest incline, and the ridges and furrows are also formed in the same direction. The ridges are split the second year of cropping, the furrow of the first year forming the centre of the ridge the second year; and consequently, the centre of the ridge of the first year forming the furrow of the second year. The third year the ridges and furrows are run diagonally, or with a slight inclination across the field, sinking the diagonal furrows two or three inches deeper than those running down the incline, in order that the former may receive the water from the latter, and conduct it into the drains. The gaining an immediate depth of active soil by the ridge-and-furrow plan of tillage must prove of vast advantage where the carrot, the parsnip, and the mangel-wurzel must take the place of the potato to a certain extent; and the facility of deepening the furrows in the summer, while the land is bearing a crop, must also appear evident as a great advantage under the circumstances in which Irish small farmers are placed; and where stones turn up in subsoiling, they may easily be collected by children, which not only affords them employment, but produces a considerable saving of expense in quarrying and drawing stones. When the crop is removed off the land, the operations of draining and subsoiling are completed.

In 1844, several gentlemen, Irish and Scotch agriculturists, met at Belvoir, by invitation from Mr. Wilson, for the purpose of viewing the standing crops on land partially subsoiled and not drained, and also to witness an experiment made in order to arrive at the probable cost of subsoiling various descriptions of land. Two crops of oats were shown; one after potatoes on a very thin active soil, with a very stiff substratum of yellow clay, and in some parts gravel. The field was tilled in the manner already described, and the crop was considered excellent. The subsoiling was tried on three several kinds of soil; first a very stiff clay loam, containing a small portion of gravel; second, on an impervious hill of indurated sand, to which in several places the crow-bar had to be applied; and, third, on bog. On the first two descriptions of hard subsoil the average number of men required to perform, within a day of ten hours, the first year's subsoiling (the furrows being being two feet wide and the ridges four feet) on one statute acre, was calculated at the rate of eight men. The moor land was subsoiled at the rate of four men per statute acre. Now, allowing eight men for the first year's subsoiling, and eight men for the second year's subsoiling (when the centre of the one year's ridges become the furrows of the succeeding year) it will take sixteen men to complete two-thirds of a statute acre, or twenty-four men per acre; computing by the current rate of wages in the locality, namely, 10d. per day, the cost of subsoiling a statute acre, according to Mr. Wilson's plan, is only £1. With reference to this mode of subsoiling, Mr. Smith, of Deanston, is reported to have said, at the Belfast meeting of the Royal Agricultural Improvement Society of Ireland—"The next thing to thorough draining is subsoil ploughing. It is difficult to render some land light and loose; but in Ireland, where the peasantry are so expert at the spade and crowbar, the difficulty could speedily be overcome. He did not care by what means the work was done, so that it was done. He was glad to find that an interest had been taken in the subject, and that Mr. Wilson had been able to bring the matter to such perfection as that he can upturn one statute acre for £1. He hoped that many would follow his example, and disturb the bottom soil."

This mode of loosening the subsoil is still suc-

cessfully practised by Mr. Wilson, not only on the land in his own hands, but also throughout his property generally. Referring to the beneficial effects of draining and subsoiling, Mr. Wilson observes :—"On the drained and subsoiled land, the tenants are now enabled to put in their seed within forty-eight hours after the heaviest rain; before, they sometimes had to wait a week or a fortnight, and then perhaps came another fall of rain. In the latter end of February, 1845, John McMahon (one of Mr. W.'s tenants, was able to sow oats in a field —which had been previously cold, sour, and wet— in consequence of its being drained and subsoiled, and had his oats stacked, before any of his neighbours in the limestone soil had cut a blade of oats; and numbers who viewed the crop pronounced it to be one of the finest they had seen that year. And here be it observed, as a general effect, that to the *subsoiling* of McMahon's land, which had been well executed, is to be attributed the result alluded to; for subsoiling, well executed, will enable us to dispense with one-half the number of drains which would otherwise be requisite. On the town lands Dromnakella and Belvoir, and particularly those of Cragg and Suaty, the condition of every individual tenant has improved. On the division called Butterhole, where, with three exceptions, the greatest possible poverty existed, a spirit of industry has arisen, such as I defy any similarly situated locality to excel. And in place of an *offer* to abandon their holdings in despair of ever being able to discharge their arrears of rent, or time-bargains, they have discharged the one by allowances for draining and subsoiling, and are gradually discharging the other; and, even while doing so, have increased their stock."

From accounts kept with great accuracy, and deposed to by the tenants themselves, it appears that within the space of six years ten cottier tenants —holders of 191 acres, their entire rent being only £122 10s. 11d.—paid for meadow hay to the amount of £148 17s. It also appears that one townland—containing seventeen families, and occupying above 320 acres, paying a rent of only £186 7s. 11½d.—paid for potatoes within four years the large sum of £531, and even more; but as it was intimated that they would be sworn to the truth of their statements, they kept within the mark. Within the space of eighteen years, fifty-three cottier tenants, holders of only 627 acres, their entire rent being £598 12s. 6d., lost 743 sheep; one tenant, the holder of only 21 acres, paying a rent of £15 4s., sustained a loss of 38 sheep. All these losses and expenditure arose chiefly from excessive moisture and bad cultivation, and might, to a great extent, if not almost entirely, have been avoided by a proper system of draining, subsoiling, and the adoption of a judicious rotation of cropping.

The *lazy-bed* system of tillage has everywhere been condemned and ridiculed, and considered as an apt illustration of the ignorance and indolence of Irish farmers; but, though admitting the incomparable superiority of the drill culture in dry land, it may be questioned whether the lazy-bed system is inferior to it in the cultivation of green crops on cold, wet, shallow soils; in fact, experience has proved the ridge system to be preferable under such circumstances. But there are various modes of ridging, the most approved being, in the case of potato culture, placing the sets in rows across the ridge, by which means the intervals between the rows can be tilled and cleaned during the growth of the crop. On the undrained land, Mr. Wilson lays out his potato ridges, the same width as for oats, viz., four feet, placing the sets in rows across the ridges, five sets in each row, and the rows varying from eighteen to twenty-two inches apart; thus saving seed, being enabled to hoe and keep the plants free of weeds, to dig out the potatoes at less cost without injury, and increasing the produce over the old lazy-bed system in the proportion of one-sixth. Turnips and mangel-wurzel are grown in the same manner. Mr. Wilson has very much exerted himself to introduce amongst his tenantry the practice of house-feeding, and to convince them, by actual experiment, of its advantages, in both of which objects he has to a certain extent succeeded.

The teacher of the Belvoir National School (to which a small model farm is attached) was directed by Mr. Wilson to make an experiment for the purpose of proving the advantage of house-feeding. I give the results, which may prove interesting, in the teachers' own words :—

"*Nov.* 7, 1844.—I had my cow (a very small one, and a poor milker) milked at 11 o'clock, A.M., in the presence of thirty-six of Mr. Wilson's workmen. The milk measured by his steward was 1 quart and 3 noggins, and at night her milk was but 3 noggins.

Nov. 9.—Milked before the workmen at 10 o'clock, A.M., 1 quart 1 noggin, and in the evening again before them 3 noggins.

Nov. 11.—I got her in, to house-feed after the following manner :—

1st feed, 6 o'clock A.M., cut straw, hay and turnips, all boiled together (called steamed food).
2nd feed, 8 o'clock, raw turnips.
At 10 o'clock, let out on the field till 12 o'clock.
3rd feed, 12 o'clock, hay.
4th feed, 3 o'clock P.M., steamed food, same as in the morning.
5th feed, 6 o'clock, raw turnips and mangel wurzel leaves.
6th feed, 8 o'clock, hay.

The result was an increase from the first day to the third, when she milked 2 quarts in the morning, and the same at night; on the 8th day 2½ quarts at each milking; and on the 12th day, after being put in, she milked three quarts at a time.

	£	s.	d.
From the day on which she was put in to house-feed up to the 1st of April (being 140 days), her milk averaged 5 quarts per day, at 1½d. per quart..	4	7	6
On the 1st of April the turnips and mangel wurzel not being nearly consumed, I increased her feeds, when she averaged 6 quarts a day for the first fortnight, and 7 quarts during the remainder of the month, being 6½ quarts per day for 30 days, or 195 quarts at 1½d. per quart	1	4	4½
May 9.—The vetches were now fit for cutting, and the supply of turnips and mangels continuing up to the 15th of June, she frequently milked 9 quarts a day. Her milk at this date (1st August) is 9 quarts, allowing an average from the 1st of May to the present date, being (92 days) at 8 quarts per day, or 736 quarts at 1½d. per quart	4	12	0
Total amount from Nov. 11 to Aug. 1	10	3	10½
Deduct the value of 21 cwt. of hay, at £2 per ton	2	2	0
	£3	1	10½

The quantity of ground under green food was as follows:—

	Square perches, statute measure.
Mangel wurzel	10½
Swedish turnips	21
Aberdeen turnips	9½
Vetches and rape	15
Total	56

(equal to 35 Irish)."

An Irish acre of ground bearing crops such as the above, and being turned to the same advantage, would (notwithstanding the cow being such a poor milker) bring in a return of £46 10s. (minus the price of hay) together with a large quantity of manure.

Before closing this notice of the Belvoir National School, and its small model farm, I cannot avoid introducing the following excellent observations by Mr. Wilson:—"There are two propositions upon which all must agree, viz., the necessity of introducing a better system of agriculture, and the utility and practicability of attaching model-farms to the several national schools. To legislate on the subject will not be a matter of much difficulty: there are no conflicting interests to embarrass the question; and if government refuse aid towards the system, let the sums requisite be levied off the several counties. This is a matter of the first importance, and should not be deferred. A lapse of nine years (since I turned my attention to the subject) has only tended to confirm me more fully in the necessity which exists for, and the vast advantages to be derived from, the establishment of schools of this description generally throughout the country. The young have only to be taught, the old *un*taught. The little farm attached to the Belvoir School is only yet in its infancy, being in operation only a few years. It consists of but 3½ acres of poor land, at the foot of a mountain, rocky, and with a very thin soil. The labour in clearing and subsoiling has been very great; but the spirit and energy with which the boys labour is astonishing and most gratifying. They take a pride in their work, and watch the progress of the crops with the greatest interest. A spot presenting greater difficulties could scarcely have been chosen; but independently of its contiguity to the school house, its barrenness and difficulty of reclamation were its great recommendations; for if on such a spot reclamation could be effected, and good crops produced by the proper application of the labour of *little boys*, it left *able-bodied men* possessing superior ground without any excuse, whereas had better land been selected, the observation would be—'It is easy for Mr. Wilson and the master to grow good crops on such land as that; but if they had such land as ours, I'd like to see what they could do with it.' The boys occasionally attend on the master's *one* little cow; they see her kept almost continually in the house on the turnips and mangel wurzel which they themselves had raised, giving his family abundance of milk and butter; while their parents, some of them with *two*, and some with *three* cows, have not perhaps a second quart in the day: this must tell."

Mr. Wilson has found that leases and low lettings will not of themselves insure the comfort and independence of the tenant; in fact, that leases operate as a positive *bar* to improvement, in the case of small farmers in the district in which he resides. In the year 1819 a thirty-one years' lease of the lands of Upper Cragg expired, the yearly rent being £26 Irish. It was then partly divided, and re-let, producing £114 2s. 8d. A division of it, called Butterhole, was let for £40 Irish per annum, to Messrs. Manners, Murrays, and partners in common; and in two years after, one of the partners, holding one thirty-second share at £1 5s. per annum, re-let that share for £2 10s. per annum to Patrick Malony. The latter now possesses one horse, two cows, two yearlings, twelve pigs, together with plenty of provisions; while four of the original lessees, holders of three, five, and six shares,

have among them all neither horse, cow, sheep, or young stock, and but one pig,

In 1812, Mr. Wilson granted a lease of a farm for thirty-one years for £48 a year. In 1816 he took one acre and a half from the tenant, in order to straighten bounds, and abated his rent for the residue of his term to £31 a year. At the time of letting, almost the whole of the farm was in grass, and in excellent condition: house in good repair: most of the fences in good order. Shortly after giving the abatement, another house was built, and a family of nine persons brought in upon the land. The farm fell out of lease in May, 1843. There are now three families on it, two of them in the most abject state of poverty. The fences are destroyed: there is not a single tree or bush standing on the farm: the houses are in such a state that it is almost unsafe to live in them. The entire of the land, with the exception of a very few acres, is turned up, and in such an exhausted state as to be incapable of bearing any crop; and the very best part of it, which, when the farm was let, was considered to be worth 40s. an Irish acre, is now producing from its bad treatment not more than 28s. per acre.

Suaty Massey contains about 100 acres of arable land, and about 100 acres of mountain and bog, plantation measure, the rent being only £27 0s. 8d. per annum, on a lease for three lives; the immediate tenants being ten in number, the under-tenants six. The greater number of both immediate and under tenants are in a state of the greatest poverty, several of them without a cow, and some of these, without even a cow, have their holdings free, in consequence of the profit-rents paid by the under-tenants. Their houses are in a state of the greatest dilapidation, and every thing bearing the appearance of poverty and distress. The arable part is very dry, consequently there had been no failures in the potato crops from wet seasons. Suaty Massey and Suaty Wilson had been a joint property, which was divided. Suaty Massey was considered the better division of the two. Suaty Wilson, though not at all in an improved condition, pays £70 12s. 3d. per annum; and yet there was not £10 of the November rent, 1843, due on the 10th of January, 1844 (*vide* Mr. Wilson's evidence before the Land Commission).

In order to stimulate improvements on his property, the strongest inducements have been held out by Mr. Wilson to his tenantry. The following proposition was made to them collectively in the autumn of 1844:—"In September, 1848, I pledge myself to grant three leases of lives, renewable for ever; three for sixty-one years, and three for fifty-one years—to those nine tenants who shall have so improved their farms as to be declared most worthy of this boon. The farms must have been drained, subsoiled, fenced, and divided with straight fences; the houses, offices, and farm yards be in good order; the rent to be now fixed on being such as the farms could fairly pay when in the state above described. Mr. Wilson to allow for the improvements, and to furnish timber and slates, windows, pay carpenters and masons; the tenants to find stones, attendance, and to diet the tradesmen."

It would occupy too much space to enter into the several individual cases of improvement which have taken place since the above proposition was made. In some instances, Mr. Wilson states the improvements have been small, in other instances very great, as compared with former times; but in the town-lands of Belvoir, Cragg, Suaty, and Drumnakella, the spirit of improvement has extended to all the tenants. The culture of turnips and flax is increasing; and cattle, in some few instances, are being almost continually kept in the house. The rundale or tenant-in-common system has been abandoned: fences have been straightened; and each man now labours on his own holding, and for himself alone.

With the view of alleviating the distress arising to cottier farmers from the losses which frequently occur among their cattle and crops, Mr. Wilson has established a "benevolent fund." The accounts are settled half yearly, and the property lying contiguous to the demesne of Belvoir, the tenants are called upon to work a few days in spring and harvest, for which they get credit at the settling of the accounts. One shilling is then taken from each man's work account for the benevolent fund. Mr. Wilson, the parish priest, and two or three of the most respectable tenants, then select those among the tenantry who may have met the most heavy losses, and apportion the sum to be distributed among them, according to the losses they may have sustained. The sum awarded is then placed to their credit. Mr. Wilson adding also to their credit a similar sum, whatever it may be. The plan of the benevolent fund has these advantages:—It is simple in operation; the tenants are not called upon to contribute any money, neither is the landlord; the tenant merely gives one and a half day's work; the landlord gives up a portion of rent or arrear, which the previous unexpected and unavoidable losses of the tenant would have rendered it in all probability very difficult for him to discharge; and thus by the mutual co-operation of the tenants and the landlord, each giving that which comes lightly, the balances are reduced against those who most stand in need of relief.

The annexed tabular statement will illustrate the beneficial objects of the benevolent fund established at Belvoir. The statement contains the disbursements from 1841 to 1845 inclusive—

Names.	Date.	Distribution. £	s.	d.	Nature of Losses.
Lot McNamara	1834	4	9	0	by sickness and of horse
Thomas Mullins	—	3	10	8	of health and provisions
Thomas Carmody	1835	6	13	1	of health
Andy Brody	1836	1	7	11	of cattle, failure of crops
Michael Tuohy	—	8	8	0	of cattle
Thomas Mulready	1839	2	9	5	house burned, crops injured by flood
David Fogarthy	—	3	2	9	failure in crops
Andy Brody	—	8	0	0	of crops and cattle
William Ryan	—	12	0	0	of crops by flood
Edmund Malony	—	2	19	5	of cattle
Peter Mulready	—	1	8	0	failure in crops
Tim Ryan	—	2	0	0	do.
Patrick McDonagh	—	2	0	0	to son for funeral expenses
Stephen Gray	—	4	12	8	failure in crops
Martin Stephens	1844	3	0	0	of cattle
Widow of Peter Lyons	—	2	0	0	husband died
Widow of T. Lyons	—	2	10	0	do.
Widow of Mankeen	—	1	0	0	do.
Patrick Hefferman	1845	3	10	0	of stock
John Flannery	—	8	0	0	of health and stock
Patrick Malony	—	5	0	0	of crops
Terry Lyons	—	5	0	0	
Total distributed		101	4	4	
To be distributed		7	14	0	

THE LAND STEWARD.

(FROM A CORRESPONDENT.)

(*Continued from page* 561, *vol.* xvi.)

In very many cases, the gardens belonging to the family-mansion are exclusively managed by the proprietor, and, in that case, the interference of the agent may not be so strictly required; only, when he is required to pay the monthly bills of expenses, he must know to his satisfaction that the items are sanctioned by the proprietor, or some member of the family. In the hands of the agent, the two separate departments of the forester and the gardener will require a page of Dr. and Cr.; the balance of the former will be carried to the proper side of the closing estate general cash page, and will show the gain or loss on the score of woods and plantations. But in striking the balance of this account, there must be made a very careful notice of any "extraordinary" undertaking being done in that year—such as enclosing and making a new plantation, cutting down and renewing old ones, and any other thing that is palpably beyond the fair routine of a self-supporting business. Such "extras" must be charged to the general expenses of the estate, and continue to be thus charged for yearly repairs, until the growth of age renders a value in return, when it may be included in the list of receivable values. The garden account is ever a dead loss, as it never shows any receipts to place in opposition to the expenditure; the produce never being valued, but must go to the account of "luxury."

On large estates there will be kept horses, hounds, and dogs, all which will incur expense in keeping, and that will come under the "surveillance" of the agent. The best way is to allow the head person of each department to provide what is wanted for the support of his charge, and he draws upon the agent "monthly" for the money that is wanted. In other cases, in order to avoid any collusion in the transactions of these subaltern employers, the manor bailiff or the farm bailiff is employed to procure the requisites for every department, and draws upon the agent for money, giving him in return, "monthly", a specifically detailed account of the several purposes to which the money has been applied: this last method is preferable. These separate accounts being entered in the agent's book, on the respective pages, will

show at any time the expense of each establishment, and the amount may be carried to the balance sheet of the general cash account of the agent's book, which is settled half-yearly. A separate page will be required for game, horses, and dogs; in which must be entered every expense paid for wages of attendants, and provender for the animals.

On all estates that are properly arranged, and where systematic order is established and duly maintained, it is most essentially necessary that all money be paid by the agent alone, and that no arrangements be made, nor any undertakings be carried forward, without his privity and direction. Without this arrangement of one chief person having centred in himself the fixation and direction of every undertaking, and of every subordinate department, confusion will necessarily ensue, attended with clashings and collisions and attempts at subordinate independence, which invariably do damage to all the concerns that are interested. The proceedings and results of transactions are infinitely much easier observed and examined by any proprietor in the accounts of one person than of many, and consultations are much easier made, and decisions are very much quicker accomplished by corresponding only with one person than with a number of discordant and frequently very ignorant opinions. Consequently a properly adjusted establishment, consisting of a chief-director and his subordinates, should resemble the "staff" of the general of an army, where the duty of each inferior agent is most clearly chalked out for him, and the means are allowed him for accomplishing the orders he may receive. In the conferences that the agent must necessarily have with his subordinates in office, it is his duty to listen very attentively to every suggestion that any one of them may offer in his own proper department, and then he can draw an opinion for action from the consideration of his own observations and reflections, joined with the cursory remarks that may be offered. He must at all times appear superior to the need of advice, and at the same time he must seem open and willing to receive, for consideration, the hints of practice, and the observations of the respective employments with which he is connected. A friendly urbanity of disposition goes very far to promote that degree of willing cheerfulness that so very powerfully advances the onward progress and the fruitful termination of every undertaking to which unity of purpose and cordiality of support are most essentially requisite.

It has been mentioned that the agent must reside on the estate, for the purpose of a personal and frequent inspection of every proceeding, and of getting acquainted with the characters of individuals, and of directing every subordinate department. A constant and minute surveillance must be exercised by him in every particular affair; and upon no account and in no affair must he rest satisfied with reports, nor allow the interested motives of those persons who approach him to influence his opinions or bias his judgment. To act upon hearsay, even on the most trivial occasion, shows a very great weakness in the powers of perception, and a disposition much to easy in the nature of compliances, to enable the manly part to be called forth, than which no qualification is more required in the arduous situation of being placed between opposite and very often conflicting elements. A very vigorous inquiry must be made into the bearings of every affair; the truth must be discovered, and the decision and the future proceedings must be thereon made and directed. Nothing more effectually degrades a man placed in a responsible situation, than opinions and actions crudely formed and hastily executed, and which are soon found to be wrong in temperament and hurtful in the consequences. Perhaps in few offices of employment is there greater occasion for affability of manner, courtesy of bearing, coolness of judgment, and decisive energy of action when the resolution has been coolly formed. Hastiness and vacillation are equally the proofs of imbecility, that is very truly disqualifiying for such an office.

It must be laid down, and most tenaciously and inflexibly upheld as a fundamental maxim, that an estate-agent must be an agriculturist of the most improved grade. Landowners have committed most prodigious mistakes in employing lawyers, commercialists, or some similar persons, often of a nondescript character, whose sole object is ever to levy a sum of rental at any risk, and, at the same time, are utterly regardless of the source whence the profit is to be derived. Professional ignorance most effectually prevents any attention being paid to the furtherance of the art which supplies the revenue; and the engagements of another business distract the necessary attention, even were it available and useful. A visit to the estate is only paid when the rents are due, and not repeated till that term again arrives. In many cases no manor-bailiff is kept, and no inspection is employed; nor is there any regular means of approach appointed by which the wants may be stated, and the dilapidations repaired. Under such treatment the state of the lands, the buildings and fences, go to ruin; the rent is collected so long as it can be got; and when the collection is no longer possible, a very considerable sum of money is required to put the property into a vendible state, which might have been wholly prevented by a timeous interference, and a careful and constant surveillance. And there is no reason that this inspection and inter-

ference be at all vexatious; for in accordance with the simple and easily intelligible terms of the lease, it has only to prescribe to the farmer what he is not to do, rather than what he is to perform, and to enforce by mild and wholesome inculcations the never-to-be-forgotten principle that the condition of both parties is to be upheld by the fruitful state of the source whence the profit is derived. In order that this most essential principle be properly understood and duly acted upon, the knowledge of the most improved practice and principles of the art becomes most essentially requisite in the agent: and next to it is the devising and the execution of the method of enforcing it. Accordingly, the time of the agent must be constantly occupied in the business of his remunerated occupation; the keeping of all the necessary accounts will employ the time within doors, where also must be devised the ways and means of carrying on and accomplishing every undertaking, joined with plans and suggestions both for originality and for proof. For personal inspection, the management of the estate farm that is entrusted to his care will form the first object, along with the frequent examination of all and every single one of the homestead and manor concerns of the estate. The state of the plantations, roads, and fences will require a very vigilant attention; the more interior policies being very often left to the direction of the resident family. But that assignment of the care does not debar a cursory glance of surveillance along with the other departments. The next attention of the agent must be directed to the frequent visitation of every part of the estate, the distant plantations, the farm-buildings on each farm, the roads, the fences, and, in fact, every external object must be most carefully observed, and immediately rectified in case of any default being found in the condition. No more agreeable or useful occupation could be found for a rational being; and the frequent exercise of it is most indispensably necessary for creating and upholding the just value of the property. Even where a "manor bailiff" is kept, the necessity of the personal inspection by the agent is not at all removed, though it may appear to be somewhat lessened. For reports by any person, even the most confidential, are not equal to the evidence of the senses, and a prejudice or a bias from some improper source may be allowed to produce a misstatement. In order to obviate and render of non-effect the representations that may arise from the petty misunderstandings that are almost constantly occurring in human life, the frequent and intimate appearance of the chief director is most earnestly recommended, and not for the purpose of paltry condescension, or of trivial and unbecoming minuteness, but in order that the proper degree of acquaintance with every object that is derived from habitual observation and reflection may enable the agent, upon any occasion of need, to form an opinion and to give a judgment that is wholly independent of the clashing interests that may be arrayed in opposition. But on the other hand, it is most absolutely necessary that a patient and polite attention be in every case and at all times given to the opinions that are offered both *pro* and *con*; for from them there may be drawn very often many valuable hints and suggestions, both for the present occasion and for future practice. Many excellent practical rules, and even some very elevated ideas in any profession, have owed their existence to the casual remarks of ignorant inferiority, but which enjoyed the benefit of constant practice to suggest the inferences, and which require some incidental circumstance to bring them forth. And no person who is placed in an elevated position must imagine that he degrades himself by listening to the remarks, or even to the opinions of inferiors; for something is frequently to be gained; and if not, there is nothing lost. And besides, it is a duty that civility be paid to every person, upon all subjects and upon all occasions.

The estate agent being invested with the power that is required for the chief direction of the concerns of the whole property, it is necessary that all the inferior agents be impressed with a proper sense of that arrangement. If this subordination be not properly understood and acted upon, and if any directions come from another quarter to which appeals can be made for the reception of opinions, and for the support of them, a very hurtful confusion will ensue, which will disarrange the whole departmental co-operation, and give rise to secret malevolence and to lurking hostility. On the other hand, every agent who is placed in authority must use his power "discreetly," make his arrangements "judiciously and practicably," give his orders "civilly, but firmly and decisively;" convey the necessary censures "authoritatively, but blandly;" commend "freely, but duly restrictive;" and in every case to judge coolly and dispassionately, and act energetically. An ample supply of prudent discretion, and a very great command of temper, are most essential requisites in such an employment; for in very many cases there are to be encountered very frequent rebuffs and mortifications that almost daily arise from the perpetual collision of jarring interests, and which naturally converge to the central focus of the agent's employment. This point very often forms the most arduous part of the official duty.

In such situations there is nothing more necessary and becoming than the propriety of appearance and behaviour that belongs to the particular grade

in society in which any individual may be placed. The land-agent is exposed to the frequent contact of superiors and inferiors, and to both these grades he must learn to exercise the proper deportment. To the former, and to the opinions which they entertain, he must show the respect that the constitution of society awards them, give opinions with the firmness and proofs which the professional knowledge will supply, and render statements and answers with the caution and prudence which the nature of every individual case may require. In all such transactions every appearance of "heatedness" must be avoided, which only serves to produce irritation, and mars the face of every proceeding. Towards inferiors, courtesy and affability are absolutely indispensable, in order to secure the good-will and affection of the operatives in every undertaking, and who form the muscles and sinews of every active operation. Harshness must in all cases be avoided, even though the amount of provocation may appear to justify the exercise. Conciliation must form and cement the attachment; harshness will sever it for ever.

It is necessary that the agent read very extensively, in order to obtain a knowledge of everything that is progressing in the agricultural world; for even if such information be irreducible to practice, it still forms matter for a very agreeable conversation, and even for some serious reflection; and, in order to render such knowledge accessible and useful, a very constant communication and visitation must be maintained by the agent and the tenantry, more especially by the former personally inspecting, as before mentioned, every farm on the estate, making observations and suggesting improvements. In order to promote these latter benefits, a farm on the estate must be placed under the practical management of the agent, on which every feasible suggestion and theory must be tried, and the results exemplified; and for this purpose the whole, or the greater part, of the yearly value of the farm or the rent of the land must be sacrificed by the proprietor; for the establishment of every truth must be bought with a price, and that price must be paid by the landowner, and the result transferred "gratis" to the farmers. The agent must reside on this farm, and have the necessary means allowed him for carrying forward the suggestions of genius. An extent of 400 or 500 acres is the best size of a farm on which to show the various processes in a suitable extent, and to exhibit them conducted in the proper combination. Such an extent also gives the power of showing the different experiments in various relations of soil, and either preceding or succeeding the different crops of cultivation. Varied relations are very necessary in constituting a useful fact. An example of this practical nature being constantly before the eyes, and open to the inspection of the farmers, would much more effectually contribute to the advancement of agriculture than any encouragement that can be given to bookish learning; for it reduces the latter to practice, and shows that theories are tangible. The absence of this reduction to practice has ever formed the fatal obstacle to progression in the *one* most essential and noble of all the arts that are practised by mankind.

The last, but not the least, important part of the duties of a land-steward is the correspondence with his employer, the owner of the property. The position in society of the latter individual often removes him wholly beyond any notice of the concern; and even his constant or temporary residence does not enable him to enter into any considerable knowledge of the business: the drudgery forbids it. In this case, the knowledge and judgment of the agent come into full play, as upon his opinions and course of proceedings the prosperity of the property and the necessary welfare of the subordinate parts do in a very great measure depend. The most extensive and correct professional knowledge does not of itself fully supply the wants of this most important field of action: there must be *judgment* of the most enlightened kind brought to bear on every transaction, however small or trivial it may appear to be. It is on this account that we have enlarged so much on the subject of a general and liberal education, in order to raise the ideas and elevate the conceptions beyond the mole-eyed plodding in the mud of vulgar and obsolete prejudices, and the clay-born sympathies that cannot understand, and consequently scout and condemn, the soarings of genius and the flights of originality. Without judgment to systematize the brightest conceptions, and without steadiness to direct the attainment of objects, no business will ever be fruitful, or will become conducive to the general purpose.

As the owner of the property is necessitated to rely on the estimate and representations of the land-steward, and to give the required sanction to any measure almost wholly on his calculations, there occurs the most pressing necessity that these estimates of opinion be composed on a very firm basis, and after the most mature reflection. Hasty decisions and crude calculations must be most carefully avoided, for the consequent miscarriages do very much mischief, both directly and indirectly: they are exposed to contempt, and tend to prevent any future attempts of a similar nature: they also induce the proprietor to distrust the trustworthy confidence that should be ever reposed in an agent, and to think that his own interference becomes the more necessary, and also to hear and consider other

opinions on the subjects that come under consideration. The agent thus loses his proper "status" on account of these former misgivings, and also the confidence that is necessary to the undertaking and executing the beneficial improvements on the property. Envy and malevolence are ever ready to exert their evil offices whenever the least opening occurs. To prevent these gaps of offence, the most careful attention is required.

The general and professional education of the agent must be such as will enable him to form ideas and concoct plans which will bear a severe investigation, and stand the test of the most rigid scrutiny. The language of conveyance must be clear and intelligible, pithy and short. The answers will consequently be the quicker obtained, and the easier followed. The agent's mind must be constantly occupied with this occupation, devising modes of necessary improvements, arranging the execution and obtaining the consent and sanction of the proprietor after there have been bestowed upon them the necessary explanations and elucidations. In this way the universal benefit will be most usefully promoted.

THE FARM BAILIFF.

On farms of any considerable size, on which the amount of capital that is embarked gives to the possessor a claim to an adequate return, so as to procure him a living, and a mode of life to be free from drudgery, an operator called "a farm bailiff" is required, for the purpose of assisting the occupier of the land in carrying into execution the necessary details of the cultivation. This person must have been bred from boyhood in the constant exercise of agricultural operations, so as to have acquired a most thorough knowledge of the nature and extent of each. It is most essentially necessary that he be a perfect master of every practical process in cultivation; for when a person is thus acquainted with any performance from personal experience, he is much better qualified to describe it, and to give directions on the subject, than if the recommendations were the mere results of observation, however acute and penetrating. In addition to these primary qualifications, the farm bailiff must possess as much learning as enables him to keep a correct account of the daily labour on the farm, and of the corns in the granary regularly as it is thrashed and sold. The form of the wages book is subjoined:—

The account is rendered weekly; the amount of the money is given to him, which he pays to the respective parties. The other accounts are given in as the transactions take place, and entered in the general farm account book, in which the weekly wages are entered in one sum, as "per bill of wages."

WAGES BOOK.

An Account of the Names of Persons in the employment of _____, at _____, and of their Daily and Weekly Labour and Wages, for four weeks, from the ____ day of ____ to the ____ day of ____, 18__.

No.	Names of persons employed.	Business.	Wages per day.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	Amount per week. £	s.	d.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	Amount per week. £	s.	d.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	Amount per week. £	s.	d.	Observations showing how each person is employed.

In order to ensure sobriety and steadiness as much as possible, it is better when the farm-bailiff be a married person; for of all requisites for such an office, steadiness may be termed the very first, both in kind and degree; and in order to give encouragement to attention and activity, the wages given must be fully "one-third" above the common wages of labour, as a reward for the tear and wear both of body and mind that are exerted in such an office. The cottage-dwellings for all the farm labourers must be placed within a moderate distance of the farm-yard, and the bailiff must live in one of them, in which some betterness of condition may be made to appear. A garden and a pig-stye are most necessary appendages to each cottage; and the cows, when the keep of one forms a part of the wages, have a standing in the farm-yard. A fixed quantity of potatoes planted in the field forms a very useful article to the labourer's family, for the children, the cow, and the pig.

(To be concluded in our next.)

LAW OF LANDLORD AND TENANT.

In proceeding to offer some remarks on the second branch of the subject of "compensation to tenants for permanent improvements," treated in the report of the Committee of the Society for the Improvement of the Law, and given in our journal last month, we cannot refrain from noticing a peculiarity in the wording of the reference to the committee, which, without in anywise wishing to impute motives to the framers of it, has at all events an appearance of prejudging the question, by pointing out one branch in particular, namely, "the present rule of law, which prevents an agricultural tenant from removing fixtures," as the object most worthy of the consideration of the committee. We by no means desire to underrate that branch of the subject. The committee has rendered invaluable service by the decision arrived at; but seeing that, as a general rule, buildings are erected by the landlord, we are decidedly of opinion that the second branch of the subject, upon which the committee has come to the conclusion that they "cannot, though fully alive to the importance of the object proposed, recommend with confidence any alteration of the law," is by far the *most important*.

This part of the subject is thus defined:

"2ndly—Those improvements which are so embodied with the land as to be incapable of separation from it."

The consideration of this question seems naturally to divide itself into two parts:

1st, The *right* of the tenant to the improvements specified.

2ndly, The means by which that *right* can be made available.

As regards the *right*, it is not only not questioned, but it is positively affirmed by the report. It is stated that landlord and tenant are "PARTIES to a CONTRACT concerning property, in which the *rent* on the one hand, and the *usufruct* of the land on the other, form the only terms." It is further stated that, as regards the treatment of the land by the tenant, "he must return it uninjured; but nothing short of special contract should oblige him to restore it improved. If, therefore, the tenant has during his tenancy made any addition to the land, he ought at the end of his tenancy to have the right of appropriating such addition for his own benefit." The "injustice" of the existing rule of law, which prevents the tenant from "appropriating such additions for his own benefit," is strongly dwelt upon. The obstacles which it interposes to improvement are pointed out, and it is finally concluded that "the present system is *injurious to the reversioner (the landlord), as well as unjust to the tenant.*" A stronger condemnation it is scarcely possible to pronounce. Nothing further therefore need be said upon this part of the question.

We now come to the second part—

The means by which the *right* of the tenant can be made available.

The improvements which come under this branch of the subject are defined by the committee to be

"Fences, roads, works for irrigation and draining which permanently improve the soil."

"The application of lime, marl, and other substances the effect of which extends beyond the first year." And

"The application of guano and other foreign or artificial manure, the effect of which is temporary."

In considering this branch of the subject the committee has propounded the following questions:—

"1st. Is it proper that the landlord should be compelled to buy what he has never bargained for?

"2ndly. What are improvements for which he ought to be obliged to pay?

"3rdly. Ought not the landlord to have the option of making the improvements himself?

"4thly. By whom, in cases of difference, is the question of compensation to be settled?

"5thly. On what principle, and at what stage of the proceedings, is this to be done?

"6thly. In what manner are the claims when settled to be enforced?"

In remarking upon these questions we propose to consider the question which stands third in order, first. We think that as regards "fences, roads, works for irrigation and draining which permanently improve the soil," the landlord ought to have the option of making the improvements himself; but that having had the option given to him, his declining so to do should be regarded as permission to the tenant to make them.

We hold that the act of letting land, unless there are express stipulations to the contrary, involves an implied contract to give the tenant the full use and benefit of it; and to evict him before he has obtained the return of an outlay which the very nature of the occupation requires, is an infringement of that contract, and, as stated in the report, is "unjust." But suppose the landlord to have declined to make the improvements specified, and that the tenant has carried them out at a considerable expense, then comes the question, "Is it proper that the landlord should be compelled to buy what he has never bargained for?" If he permits the tenant to continue in possession of his farm for a sufficient length of time to obtain a return for his outlay, he will not be required to "buy" anything. If, on the other hand, he prematurely evicts the tenant, it is but just that he should pay for improvements, the benefits of which he will immediately enjoy. But then, it may be said, cases will occur in which the tenancy may be put an end to without any act of the landlord. Admit it. Can it be questioned, if the landlord be unable or unwilling to pay for the improvements, that a tenant will speedily be found?—an improved estate at a low rent will not be long in the market. As regards the "application of lime, marl, guano, &c.," it is so absolutely necessary for the proper and usual cultivation of the soil as to render any permission from the landlord unnecessary. That compensation should be made for such portion as may remain in the soil unexhausted, and to which the tenant has a *right*, cannot admit of a question. Whoever pays for them, whether landlord or incoming tenant, has value received, and upon no principle of honesty can compensation be withheld.

Next comes the question—"By whom, in case of difference, is the question of compensation to be settled?" By the same persons as all valuations between landlords or incoming and out-going tenants are now settled—by whom all valuations of such like property when transferred by private bargain from one party to another are made, and by whom the value of the landlord's property as well as the tenant's rights in farms and buildings, parts of which are daily taken for the purposes of railways and other public works is fixed, and the mode of valuing which is now perfectly understood. The principle of compensation for unexhausted improvements is fully admitted and acted upon in railway valuations, as well in the case of a tenancy from year to year as upon lease.

By the fifth question it is asked—"On what principle and at what stage of the proceedings is this to be done?" As regards the time, decidedly at the close of the tenancy. As regards the principle upon which the valuation should be made, we see no difficulty that individuals of experience and judgment cannot surmount.

A difficulty has been raised as to the extent of the outlay, inasmuch as it is apprehended, if wholly unlimited, the tenant might involve the landlord in a heavy and inconvenient expense; and it has been suggested that the outlay should be restricted to three years' rent. It is perfectly clear that such a limitation would be futile, as, in a majority of cases, the lower the rent the greater would be the sum required to be expended. An efficient check upon the outlay of the tenant would be found in the fact that he would have compensation awarded to him for any unexpired term which might be requisite to reimburse him, not for his outlay, for that might have been improvident or ineffective, but for the share of actual benefit which he would have been entitled to had the due period of occupation not been prematurely terminated. In respect to the objections that

> "It would be almost impossible to devise a general scale of deduction for subsequent enjoyment applicable to the whole country: an operation which improves the land for two years in one county may be felt for three times that period in another. Materials may in one place be perishable; in another they may endure for an indefinite time,"

we consider them groundless. Every case would be decided upon its own merits, just as ordinary valuations are now made. We do not want rules laid down for the guidance of valuers; we want simply the *principle* of compensation for improvements conceded. The details will involve little difficulty.

As regards the sixth question, having reference to the manner in which "claims when settled are to be enforced, that cannot form an obstacle."

The committee, after expressing their inability to "recommend with confidence any alteration in the law," conclude in the following terms:—

"They think, however, that in such alteration, if attempted at all, the following principles should be adopted:—

"1. Improvements for which compensation is to be allowed should be carefully specified by means of information obtained from persons of agricultural experience.

"2. No compensation should be given, unless the te-

nant has given the landlord the option of doing the work himself.

"3. The propriety, extent, and cost of the work should be settled before it is done.

"4. Disputes should be settled by arbitration.

"5. Compensation should be limited by reference to the annual rent; and within these limits its measure should be the prime cost of the work, subject to a deduction, bearing for each class of improvements a different but fixed proportion to the length of subsequent enjoyment by the tenant.

"6. It should be subject to deduction, *pro tanto*, in case of incomplete execution.

"7. A subsequent holding should, for the purpose of compensation, be considered a continuing holding.

"8. If the landlord is the absolute owner, the compensation should be recoverable both as a charge on the land and as a personal debt from him."

Upon which we would reply, in order.

1. No specification is requisite. The duty of estimating the amount and value of the improvements should be entrusted to "persons of agricultural experience," at the termination of the tenancy.

2. The option should only be given to the landlord, as regards fences, roads, draining, and irrigation.

3. This is wholly unnecessary, inasmuch as the tenant can only have claim for such works as are actually beneficial improvements, without reference to his own outlay.

4. Arbitration is the most convenient and equitable mode of settling disputes.

5. To limit compensation by reference to the rent would be absurd, inasmuch as land at the lowest rent will, generally speaking, require the greatest outlay. The valuation must be made according to the usual practice.

6. Incomplete execution will form an ingredient in the valuation.

7. A very proper regulation.

8. A fair and equitable protection to the tenant.

Having carefully considered the second part of this report, we are induced to believe that if the committee had possessed the advantage of the assistance of some "persons of agricultural experience" the doubts which they entertain would have been removed, and we should have had a decision as sound and as positive in reference to the second branch of the question as we have in respect to the first.

THE AUSTRALIAN WOOL TRADE.*

BY WM. WESTGARTH, ESQ.

The importance at present assumed by the Australian wool trade in the lists of British commerce demands some degree of attention in the history of an Australian settlement. I shall, therefore, devote the present chapter to a short account of this branch of commerce, in its capacity both of an export from the Australian colonies and an import into the British market.

In the year 1836 the quantity of wool exported from Sydney amounted to 3,700,000 lbs. weight. The proportion for the Port Philip district, included in this amount, could not, at so early a period of her existence, have exceeded 60,000 lbs. weight. Five years afterwards, the annual produce had attained to 1,578,000 lbs.; and the lapse of a similar period, bringing us down to the year 1846, exhibits the astonishing quantity of 7,400,000 lbs.† During this interval of ten years the quantity of wool exported from Sydney, exclusive of any from Australia Felix, had increased from three and a-half millions to nearly twelve millions of pounds weight.

The importation of wool into the British market appears, indeed, like the rise of the Australian colonies, to be but a business of yesterday, and one, among numerous other instances, of the wonderful extension of modern commerce. In 1820, the quantity imported was under ten millions of pounds weight; in 1845, it had risen to seventy-six millions. The proportion from the Australian colonies in the former year was the one-hundredth part; it now forms nearly one-half of the whole importation‡; and at the steady and rapid ratio of the present increase of Australian wool, the lapse of a few years will exhibit a quantity far greater than the united total of the wool at present imported into Britain from every quarter of the world. The following table exhibits the respective averages, in round numbers, for each period of five years from 1826 to 1845; the numbers representing millions of pounds weight:—

Average of years.	Foreign Wool.	Colonial Wool.	Total.
1826-30	25	2	27
1831-35	34	4	38
1836-40	44	10	54
1841-45	36	22	58
1846	34	30	64

This table illustrates the extraordinary progress of the

* From a new work in the press, on Port Philip.

† The wools occasionally sent from Port Philip by way of Sydney, and appearing in the Customs' returns as Sydney exports, are here allowed for. The season or year is taken as ending on the 10th October, as the usual date of 31st December falls in the midst of the wool shipments, and cannot fairly represent the quantities and ratio of progress of each year.

‡ In 1846, the relative quantities imported into Britain were, in round numbers, thirty-four millions of pounds of foreign wool and thirty millions of colonial. For the present year the colonial may be safely assumed at somewhat more than half the importation.

colonial production, three-fourths of which are derived from Australia and Van Diemen's Land.

The periodical public sales of colonial wool, which now occupy so important a position among the commercial occurrences of the British capital, date their origin only so lately as the year 1817. The prices at that time, and for some subsequent period, were only from 2d. to 3d. per pound; and it was not until twelve or fourteen years afterwards, that any important advance took place in the value of this commodity. The fine quality of the Australian wool began soon after to attract notice, and in 1835 and 1836 to excite the attention even of foreign manufacturers. From very small beginnings the extent of the periodical auction sales gradually increased. An unprecedented number of 750 bales was announced for one series of sales in 1825; and for some years afterwards 400 bales were considered to form a very extensive sale. But in July, 1835, 8,746 bales were brought forward, realizing for the better qualities the considerable rates of from 2s. 6d. to 3s. 8d. per pound; and at the sales of the same month in 1844, there were exposed no less than 31,358 bales.*

The celebrated wools of Australia are derived from two principal breeds of sheep, the Merino and the Saxon. The former is the finest in quality, but it may be doubted if an adequate price has been hitherto derived to compensate for the lighter weight of the fleece. In the Sydney district attention was chiefly bestowed on the Merino, in Van Diemen's Land on the Saxon; and the Port Philip district received a share of both, as the colonists from either locality transported their flocks to her pastures. This mixture of breeds was still further increased by occasional crosses with the Leicester and Southdown. In fact, from the numbers of inexperienced persons who entered on the occupation of sheep farming in this new settlement, and, without any fixed principles, carried on a mere random system of breeding, the greater portion of the wool consists of every shade of quality that natural accidents could produce. The abundant pasturage of Port Philip appears also to affect the pure Merino wool of the Sydney district, which in the former locality acquires a more open appearance, loses somewhat of its fineness, and increases about a quarter or half a pound in the weight of the fleece. The average weight of the good qualities of Port Philip fleeces, after washing, is from 2½ to 2¾ lbs.; of the Sydney fleeces about 2¼ lbs. There has been for several years a desire to introduce a greater uniformity of quality in the fleeces of each particular grower, and on the whole an inclination to adhere to the production of the finer qualities of wool.

The shearing of the sheep usually takes place at an early period of the season, in order both to secure a supply of water, and, if possible, of a running stream for the washing of the fleece, before the summer's drought has set in, and to avoid the grass seeds and burs that attach themselves to the fleece towards the middle of summer, and are very abundant in many of the sheep pastures. In dry and warm localities a commencement is made so early as the month of September, but, in general, October is the busy month all over the country. Owing, however, to the number of shearers required at this period, and the usual scarcity of labour in these colonies, the clipping of many of the flocks is delayed for one or even two months beyond the appropriate season. The present rate of wages is 12s. 6d. per hundred fleeces, besides an ample ration to each shearer. An expert hand will shear fully one hundred sheep in a day. These labourers usually form themselves into bands or gangs, each of which takes some particular locality, and makes the round of the various stations.

The fleece is generally washed before being shorn, and greater efforts are made in Australia Felix, and in the colony at large, to produce a snowy fleece, than the colonists have hitherto obtained credit for, or the appearance of the greater part of their wool would indicate. But many have no running water on their stations; with others the water holes are muddy, or are shortly made so in the washing process; and the high price of wages operates variously against all improvements. The plan of spout-washing is now generally adopted where practicable, and consists in pouring down from the elevation of a few feet a jet of water upon the sheep, as they are successively brought under the stream for that purpose. Where the fleece has been moistened for several hours previously, the spout-washing process is usually very effectual.* The sheep are never shorn immediately after washing, but a certain interval, according to the state of the weather, is allowed for the yoke to rise again in the wool; and during this period, which is usually about three days, the sheep are either confined in some house constructed for the purpose, to prevent the soiling of their fleeces, or, as more commonly happens, they are merely placed on some clean portion of the run. The return of the yoke imparts a softness to the wool which shows it to greater advantage, and further benefits the settler by increasing the weight of the fleece. In localities where the washing cannot be conveniently accomplished, or in cases where the sheep are severely affected with the scab, the fleeces are shorn *in the grease*, and afterwards scoured or washed by hand in town.

The wool is now ready to be packed and despatched to the port of shipment. Each fleece is cleared of the locks and clippings or other unseemly portions, and is usually tied with a piece of string, and tightly squeezed into bags containing about one hundred each, or from two hundred and fifty to three hundred pounds weight. The ponderous bullock dray is now yoked to its team of eight or a dozen oxen, and, charged with an ample load of the golden fleece, is despatched from the station on

* This included a small quantity of foreign wool. The proportion from Australia and Van Diemen's Land on this occasion was 26,134 bales. The early sales were held at Garraway's, and continued there from 1817 to 1843, when the locality was transferred to the Hall of Commerce, where they still continue. The first bale at the first sale, from the novelty of the circumstance, realized 10s. 6d. per pound.—*Mark Lane Express*, 7th, 14th, and 21st October, 1844.

* In the Sydney district, what are denominated the "crack lots" of wool are produced by very careful washing. Some are said to make use of tepid water. In the rage for improvement, the use of soda has been tried to correct the hardness of the water; and I have heard of a settler even plunging a cask of that material into the ocean of a water hole.

its annual and protracted mission to the port of shipment.

The wool on its arrival in town is now generally classed and repacked at an establishment for that purpose, unless this process has already been competently performed at the station. The classification distinguishes only the entire fleece; it is not attempted to proceed to a minuter distinction of qualities by breaking the fleeces. When intended for sale, the wool, on its arrival in town, is conveniently exhibited in the various bins of the sorting establishment, and its quality and condition are fairly ascertained. At the establishment of the Messrs. Bakewell, in Melbourne, the wool is assorted first into the two leading divisions of clothing and combing, and each of these descriptions is run out into five qualities, the fifth or lowest being the coarse Leicester breeds. Extra fine lots are classed by themselves: *super*-greasy, or kempy, or other defective fleeces, are also classed apart. The charge for sorting is ¼d. per pound. The usual charge for hand-washing is 1d. per pound on the weight returned, and for scouring 1d. to 1½d. per pound. The system of repacking is also of use in exposing any wet or damp that the wool may have acquired on the way from the interior, in which condition it is in danger of heating and even of originating fire in the hold of a vessel during a lengthened voyage.

The shipping season for the Australian staple commences towards the end of October; but only a few solitary drays have succeeded in reaching town during that month. Considerable quantities have arrived by the end of November; and during the two succeeding months there is a continuous succession of vehicles pouring with their voluminous loads into the various ports of the district.* These arrivals begin to fall off in February; but during that and the two succeeding months considerable quantities continue to be shipped, including the later shorn fleeces of the young lambs. The shipment of other exports, which are comparatively of unimportant amount, terminates with that of the wool. A solitary vessel may linger till July or August, when the transactions of the season are finally closed.

Thus nearly all the export produce of the district is shipped or is ready for shipment during about four months of the summer, namely, from the middle of November to the middle of March; and there is in consequence a periodical alteration in the rate of the exchange on London. During the shipping season, the numerous drafts of the colonists are disposed of to the local banks, or to other purchasers, at a rate which of course declines from a par exchange according to the relation between the supply and demand. During the remainder of the year, when few or no drafts appear in the market, the rate of the exchange is reversed. The range between either extreme was wont to be very considerable several years since, amounting occasionally to seven and even ten per cent.; at present it is seldom more than four per cent.

Where the country settler is not disposed to sell his produce in the colonial market, he usually obtains an advance upon it, to nearly the extent of its value, from a merchant, who consigns the produce for sale, on the settler's account, to his friends in Britain. The drafts of the merchants on their principals are generally accompanied by the bill of lading of the produce against which they are made; and the local banks, mindful of the calamitous scenes from which the colony has so lately emerged, adopt the further precaution of advancing to their customers only from three-fourths to four-fifths of the market value of each export.

The following from a late number of the *Sydney Herald* may be well appended to the above:—

"Our two time-honoured competitors in the production of fine wool, Spain and Germany, have been fairly beaten out of the field. The climate and pasturage of these colonies, and of the congenial settlement at the Cape of Good Hope, backed by the energies of their Anglo-Saxon race of flockmasters, have more than compensated for our greater distance from British markets. We have been enabled to supply a good article—in vast and ever-increasing quantities—and at prices which, notwithstanding the cost of carriage, have, through our facilities of production, left us a remunerating profit, but which our ancient rivals have found to be insufficient to replace prime cost.

"But although Spain and Germany have ceased to vie with us as sellers of the raw material in England, they have done so only to renew the contest in another form. They have enlarged their manufacturing operations. Since they can no longer sell the fleece at a profit, they have resolved on working it up in their own looms. To that extent, therefore, they will cease to import wrought woollen fabrics; and in so far as their imports were from Great Britain, there will be a corresponding decrease in the British consumption of our wools. The woollen cloths imported into those two countries from Great Britain, in the year 1841, amounted in declared value to £1,026,481 sterling; and if we add the quantities imported in the same year into Holland and Belgium, the amount will have been about a million and a-half. We must therefore be cautious, as prudent men, not to allow our spirits to be too much exhilarated by the apparent victory we have gained over 'our hereditary enemies,' seeing that, though seemingly vanquished, they have but shifted their position and varied their tactics.

"A judicious writer says, in 1844, 'Of late years cottons have, from their cheapness, in a great degree superseded the lower qualities of cloths; a circumstance which, joined to the increasing rivalry of France, Germany, and Belgium, *renders it improbable*, unless new markets shall be opened in China or elsewhere, *that much extension will in future be given to our manufacture of woollen cloths*.'*

"Whilst, however, the Spanish and the German woolgrowers have thus ceased (or are expected very shortly to cease) to compete with us as exporters to England, ano-

* There are five shipping ports in Australia Felix; namely, Melbourne, or its port of Williamstown, Geelong, Portland, Belfast, and Port Albert, or Alberton, in Gipps' Land. The quantity for the present year (1847) may be estimated at about 28,000 bales, of which five-sixths are shipped at Williamstown and Geelong.

* Waterton's "Cyclopædia of Commerce," p 672.

ther competitor has sprung up in a new and quite unexpected quarter. In addition to corn, bread stuffs, rice, tobacco, cotton, sugar, and an endless catalogue of 'notions,' in which brother Jonathan has hitherto prided himself as a mighty producer, he has now taken it into his head that he can breed sheep and export wool on a large scale. And it would seem that in England his whim has by no means been thought whimsical. For, say certain Liverpool brokers to him, under date of 3rd September, 1846—'The arrivals of wool from the United States last year, for the first time to any extent, *made quite a sensation in this country*, as it was generally considered that you required to import these qualities, and there was no knowledge that your growth of wool was of such importance. *We have seen it estimated at sixty-five million pounds*;* and from your vast (and to us almost incredible) means of production, we believe *it will cause a kind of revolution in the wool trade.*'

"Jonathan's own opinion of the matter is thus expressed through the medium of the New Orleans *Commercial Times*—'Wool can be grown as cheaply, and to as great advantage, in the cotton-growing States as in any part of the world. There is nothing in the climate to prevent it. If it may be found desirable to grow that of the finest grades, it can be done without fear of the animals becoming covered with hair in a few years.' He has evidently some misgivings, however, as to the policy of his attempting the finest grades, for he immediately subjoins, 'However, we are inclined to think that wool *of a coarser quality will be found most profitable*, mutton being also an object with us.'

"If the United States already produce four times the quantity of wool that we do, and if there is a reasonable chance of their producing it of a quality equal to ours, and at no greater cost, then have we indeed much to fear from their formidable rivalry. The vast extent of their territory, the almost illimitable resources of their soil and climate, the indomitable spirit of their citizens, combined with their proximity to the British market, will render their competition, if successful at all, successful in no ordinary degree.

"'Wool,' says another Liverpool correspondent, addressing an American, 'requires in its production *great attention in crossing the breed*, otherwise the quality degenerates very quickly. The maintenance of its fineness depends also very much on the nature of the pasturage on which the sheep graze. And we may remark that *your own samples are of a particularly good kind.*'"

Here is a word of encouragement for the Americans, with a word of caution for the Australians. Of the two requisites for the production and preservation of a superior staple, one, suitable pasturage, is bountifully supplied to the Australian grower by nature, whilst the other depends upon his own industry and skill. In this, it is to be feared, he has scarcely been just to himself. He has possibly presumed too much upon the natural advantages of the fine sheep-sustaining country in which his capital is staked. It will be well if this note of warning from the land of stars and stripes shall rouse him to a more vigilant attention. — Simmonds's Colonial Magazine.

WORSLEY TESTIMONIAL.

The presentation of this testimonial from the freeholders and inhabitants of the northern division of the county of Lincoln to the Earl of Yarborough, who, as Lord Worsley, represented the division in Parliament for fifteen years, and which had been delayed by the lamented death of the late earl, took place at Brocklesby, the 25th November.

The testimonial was of silver, and consisted of a plateau in three parts, namely, a centre ornament, with basket and figures, representing agriculture, commerce, science, and liberty, and two candelabra, with branches for six lights each, and so arranged as to be used together, or in separate pieces.

About twelve o'clock the members of the central committee, and a number of subscribers who had assembled previously at Great Lumber, proceeded to Brocklesby, and were ushered into the large dining-room, at the upper end of which was placed the magnificent piece of plate, the object of universal admiration.

Shortly afterwards Lady Yarborough, accompanied by the Duchess of St. Alban's, Mrs. Barnard, Miss Elwes, and Lord Worsley, entered the room, followed by Lord Yarborough, when

W. B. Wingate, Esq., of Hareby, who had been requested by the committee to present the testimonial, addressed his lordship as follows:—My Lord—I could have wished that the task which now devolves upon me had been committed to abler hands, but as I have had the post of honour confided to me, I have great pleasure in discharging its duties to the best of my ability. I am only expressing the feelings of all present when I say we sincerely regret the painful circumstances which delayed the presentation of this mark of our esteem. Though you have now ceased to be our representative, your strictly upright conduct in that position will never be effaced from our memory, and we feel assured that in the upper house, as it has been in the lower, the interest of your country will ever be dear to your heart. Accompanying this testimonial I have, my lord, the pleasing duty of handing to you an address signed by about 2,200 of your late constituents, expressive of their respect and esteem for your character, public and private.

After reading the address, Mr. Wingate remarked that some freeholders of the division, residing at Hull, who had contributed to the testimonial fund out of

* The quantity of wool exported from New South Wales, including the district of Port Philip, in the year 1843, was 17,564,734 lbs.

respect for the general character of the doble lord, though differing with him on the question of free trade, had prepared an address which he begged also to read. Mr. Wingate then said: My lord, it would not become me to add any observations of my own, further than to express my most cordial wish that your lordship, your amiable countess, and your family may enjoy health, long life, and happiness. May this our testimony of sincere regard be handed down to future generations as a memorial of your lordship's urbane, consistent, able, and energetic conduct throughout your parliamentary career; and also as a tribute to your private worth, which has ever been manifested, as we feel assured it will continue to be, in promoting the happiness and welfare of all about you.

Lord YARBOROUGH on coming forward was deeply affected. He said he had often before addressed most of those to whom he was speaking, but had never felt so much difficulty in giving expression to his feelings as on that occasion. He could assure them that he prized exceedingly the esteem and affection which was shown by the attendance of gentlemen of various shades of political opinion, many of whom had come from a great distance to present so valuable a testimonial of their regard for him as their representative. It was not possible for a member of Parliament to give satisfaction to all his constituents, in the views which he might take upon politics, but he had always considered that a member of the House of Commons should resolve to do his duty, even at the risk of a temporary unpopularity, not doubting that full justice would be done eventually to his motives by all who felt that he had acted conscientiously. This handsome present of plate proved how highly they appreciated his services, yet, valuable as it was, he could not prize it equally with the address to which the signatures of 2,200 of his old constitutents, entertaining various political opinions, were attached. It was very gratifying to him to feel that although he had never attempted by his votes to please all parties, he had deceived none. He had always considered it his duty to make known as generally as possible his opinions, and to act as he thought best for the general interest of his country. The address from freeholders of North Lincolnshire residing at Hull (some of whom had kindly attended that day) showed how difficult a task a member of parliament had to perform, in adequately representing the various interests of his constituents. At the time it was determined to present a testimonial, he had been their representative fifteen years, and he trusted that the recollection of the manner in which he had been rewarded would serve as an encouragement to his son, should he ever be in Parliament, to take a straightforward course, and thus gain the esteem and regard of his constituents and neighbours. Whilst he was their member he felt deeply the responsibilities of his position, and he could assure them that, although he was no longer in the House of Commons, he was fully sensible of the equal responsibility devolving upon him as a member of the upper House, and as a landed proprietor. He trusted that his future conduct would entitle him to a continuance of their esteem, and he would assure them it was his anxious wish to render himself useful in the county. He would not at any length allude to the delay in the presentation of the testimonial, occasioned as it had been by the loss of one so dearly esteemed by all around him. He thanked them sincerely for their kind expressions of regard, and for their wishes for the health and happiness of Lady Yarborough and his family.

Lord Yarborough then invited the company to adjourn to the refreshment room. During the repast,

J. W. DUDDING, Esq., rose and said: He trusted that the testimonial and address which had been presented to the noble lord would be long looked upon by the existing members of his lordship's family, and by future generations, not merely as a deserved compliment from a large body of the freeholders and inhabitants of the county, who had thus given expression to their feelings of attachment and esteem, but as an act of strict justice, an evidence of their appreciation of most meritorious public services performed by their representative in Parliament. Mr. Dudding concluded by proposing "The health of the Countess of Yarborough and her Family," with every wish for their happiness.

His Lordship thanked Mr. Dudding and the company, for their expression of kind interest in the health and happiness of Lady Yarborough and her family, which was highly gratifying to him, as he felt assured it was sincere. He regretted that the health of Lady Yarborough was not so good as he could wish, and said that by the advice of her physicians they would be obliged to spend the ensuing winter in a warmer climate. His lordship then proposed the health of the committee, coupling with it the name of the Duke of St. Albans, the chairman.

The Duke of ST. ALBANS said he should be wanting in correct feeling if he did not, in his own name, and in that of the committee, thank the noble lord for the very handsome manner in which he had proposed the health of the committee. He and they felt much pleasure in the presentation of the testimonial of their esteem and regards. The Pelham family, whose influence throughout the wolds of this county was so extensive, had by their kind fostering of agricultural industry been the cause of raising vastly increased amounts of produce, and had gained deserved popularity with the agricultural interest. The noble lord and his family had ever been forward in promoting works of utility, producing happy results to the community at large. Individually, he begged to thank his noble friend for the compliment he had paid him, and also to return thanks on behalf of the committee.

The proceedings then terminated.

Among those present we noticed—The Duke of St. Albans, Sir Montague Cholmeley, Bart., M.P., Sir Henry Dymoke, Bart., G. F. Heneage, Esq., Robert Vyner, Esq., J. W. Yorke, Esq., Henry Vyner, Esq., John Golden, Esq., C. B. Luard, Esq., J. G. Stapylton Smith, Esq., George Skipworth, Esq., T. J. Dixon, Esq., W. T. Welfit, Esq., F. W. Oates, Esq., B. M. Jalland, Esq., W. Jalland, Esq., Alderman Carrick, Dr. Barton, Rev. C. J. Barnard, Rev. T. B. Wright, Rev. R. G. Moore, Rev. Samuel Turner,

Rev. — Birkett, Rev. C. Newmarch, Rev. J. D. Glover, Rev. Thomas Watson, Rev. J. Van Hemert, Rev. George Robinson: Mr. W. B. Wingate, Mr. John Richardson (Northlands), Mr. J. W. Dudding, Mr. John Jones, Mr. Joseph Rinder, Mr. Henry Turner, Mr. J. J. Young, Mr. George Nelson, Mr. Wm. Walker, jun., Mr. John Booth, Mr. Philip Skipworth (Aylesby), Mr. Robert Cartwright, Mr. Hy. Moore, Mr. John Hett, Mr. Thomas Bell (Grimsby), Mr. David Martin, Mr. Thomas Armstrong, Mr. W. C. Wells Clarke, Mr. Richard Nainby, Mr. F. Iles, Mr. William Cropper, Mr. John Danber, Mr. Thomas Skipworth, Mr. William Clarke, Mr. G. M. Porter, Mr. George Frankish, Mr. Robert Martin, Mr. George Maxstead, Mr. J. U. S. Smith, Mr. Thomas Brooks, Mr. John Morley, Mr. G. M. Williams, Mr. John Waldgrave, Mr. Robert Waldgrave, Mr. J. R. Kirkham, Mr. — Wrangham, Mr. William Martin, Mr. W. Brookes, Mr. Thos. Wingate, Mr. F. J. Rhodes, Mr. Edmund Tickler, Mr. — Raithby, Mr. — Kirkham, Mr. Edward Fowler, Mr. — Pickering, Mr. — Adams, Mr. J. J. Rhodes, Mr. Henry Bird.

Sir Edward Brackenbury was prevented attending by the severe illness of his brother, Sir John Macpherson Brackenbury.

The testimonial, weighing about 1,400 ounces, was designed by Cotterill, and manufactured by Messrs. Garrard and Co., of Panton-street.

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

SUBJECT:—WHAT ARE THE PRACTICAL IMPEDIMENTS TO THE DEVELOPMENT OF BRITISH HUSBANDRY?

The usual monthly meeting took place at the Club-rooms, Blackfriars, on Wednesday, Dec. 8. The chair was taken, at six o'clock, by W. F. Hobbs, Esq. In consequence of the holding of the Smithfield Show the attendance on this occasion was unusually large.

We observed the following gentlemen present: — Mr. Turner, of Barton; Mr. Smith, of Burley; Mr. Beck, of Congham; Mr. Cheetham, of Oakham; Mr. Shaw, of the Strand; Mr. Smith, of Rye; Mr. Rowley, of Rawthorne; Mr. Harvey, of Pulham; Mr. Lattimore, of Herts; Mr. R. Baker, of Writtle; Mr. T. Hudson, of Castleacre; Captain Aitcheson; Mr. Emery, of Banwell; Mr. Thomas, of Lidlington; Mr. Overman, of Weasenham; Mr. Josselyn, of Ipswich; Rev. J. Y. Cook, of Semer; Mr. J. Pain, of Felmersham; Mr. T. S. Godwin, of Stockbridge; Mr. C. Pocock, of Reading; Mr. W. B. Webster, of Hounsdown; Mr. C. Murton, of Linsted; Mr. J. Nesbit, of Kennington; Mr. Beadel, of Chelmsford; Mr. Wood, of Cuckfield; Mr. S. Bennett, Bickering's Park; Mr. W. Bennett, of Lewsey; Mr. Walton, of Merdon; Mr. Barnard, of Olivesmere; Mr. Knight, of Bobbing Court; Mr. Flowerdew, of Hinderclay; Mr. Webster, of Peakirk; Mr. W. Shaw, of Coton End; Mr. G. Boddington, of Sutton Coldfield; Mr. W. Hutley, of Power's Hall; Mr. W. Eve, of North Ockendon; Mr Neame, of Selling; Mr. W. Gray, of Courteen Hall, &c., &c.

The subject appointed for discussion was—"The practical impediments to the development of British husbandry;" which Mr. Shaw, of the Strand, had undertaken to introduce.

The Chairman, in opening the proceedings, said: Gentlemen, it is with great pleasure that I witness so numerous and important a meeting of the leading agriculturists of this kingdom. It is, indeed, a sure sign of the increasing prosperity of our club (Hear, hear). The committee have selected a subject for discussion this evening, which is, in my opinion, the most important one that ever came under our consideration; and I think you will agree with me, that it not only concerns us as producers, but that it also concerns every class in the community (Hear, hear). When we consider that a portion of this kingdom has lately endured the severities of famine, and that we ourselves have within the last twelve months depended upon foreigners for our daily bread, we cannot but feel that it behoves us to ask ourselves the question—"What are the practical impediments to the development of British husbandry?" It cannot be doubted that the agriculture of this country is yet in a very imperfect state, and is capable of great improvement; but it would ill become me to attempt to mention the various points which might be brought forward in reply to the question—"How may it be improved?" I am happy to say that the subject has been taken up by our friend Mr. Shaw; who will, I am sure, do it ample justice (cheers). The chairman then reminded the meeting of the rule, that no person, except the introducer of the subject, should be allowed to speak for more than twenty minutes, and expressed a hope that the meeting would support him in enforcing that rule.

Mr. Shaw, of the Strand, on rising to introduce the subject, spoke as follows: Gentlemen, I am very well aware that when an individual undertakes to perform a task, of whatever kind, he exposes himself to animadversion in offering any apology for not being able to execute it in the manner that he could wish, in consequence of not having devoted to the subject the consideration which it demands; yet I must throw myself in a certain degree upon your indulgence, for it does so happen that amidst the varied occupations which fill up my time I have not been able to devote anything like enough time to a question of such vital importance as the one I am about to bring before you. Had I supposed, indeed, that I should be expected to go into the question to a length commensurate with its importance, I certainly should not have undertaken it. There are other members of the club who, for a variety of reasons, are far more capable of properly treating a subject of this nature than I am. The view which I take, however, is this: that all that devolves upon the introducer of the question is to bring it forward, and to advance the principal points; and in so full a meeting as the present, composed of individuals so per-

fectly conversant with the question, I think that the greatest possible degree of influence will be produced upon the public mind if the major part of the discussion shall devolve upon those whose interests are most deeply and immediately affected. However enthusiastic any one else may be, or however desirous of promoting the improvement of agriculture, still, what may be said by others will not go forth with half so much weight, either with practical men or with the public at large, as that which proceeds from enlightened and intelligent practical farmers (Hear, hear). I feel, therefore, that although I may open the business of the evening, I am only performing, as it were, a secondary part, and that the first and most important part will afterwards rest with yourselves. In entering upon the consideration, of a question involving interests of such paramount importance to the nation at large, and extending over so wide a field that the discussion of one division of it might well occupy a space of time much greater than can, consistently with our arrangements, be devoted to the whole, I have found that it would be impracticable to do more than take a rapid glance at the several leading points of the subject, in the hope that individual members will address themselves to separate branches of the question, and hence that a useful discussion may be induced. Well knowing the great difference of opinion, I may perhaps be permitted to say the strong prejudice, which exists upon almost all questions which have reference to landed property in this kingdom, either in relation to the interests of the owner or occupier, I am fully prepared to expect that some of the sentiments to which I may give utterance this evening will meet with dissent. As, however, my sole object is that of provoking inquiry, for the purpose of ascertaining whether there be any "practical impediments to the development of British husbandry," and if so, what they are, I trust that I shall enjoy a continuance of that kindness and indulgence which I have ever experienced from the members of this club. It may tend to show how far my mind is impressed with the vast influence which British agriculture has upon our national prosperity, by reverting to the anticipations which I entertained of the probable results of the deficient supply of agricultural produce in the last year. In writing on this subject, in September, 1846, I observed "that the next twelve months would, in all probability, demonstrate the importance of agriculture as being the foundation of national prosperity." How truly this has been verified, the expenditure of upwards of thirty-three millions sterling in the purchase of foreign food, and the fatal consequences resulting from it, but too loudly and painfully testify. It is with the hope of relieving, so far as human intellect and energy can, the effects of such a deficiency of the necessaries of life, that I desire to impress upon all, but more especially upon landed proprietors, the importance of removing any obstacles which may interpose to prevent the development of British agriculture. Looking at the agricultural class as one only amongst the other important and individual classes which constitute the British nation, an occupation which, independently of the raw material, the soil of the United Kingdom, ought to employ, if thoroughly cultivated, a capital of not less than 600,000,000, and directly or indirectly find employment for three-fourths of our population, and that too in the production of articles of never-failing demand, cannot be deemed undeserving the support and encouragement of the most ardent advocates for the exchange of commodities with other countries. There are three classes most immediately and directly interested in agriculture as an occupation, and hence interested in the subject now before us, namely, 1st, The Landlord; 2nd, The Tenant; and, 3rd, The Labourer; and it is with reference to the individual, as well as the relative situation of each of these classes, that I propose to consider what are the "practical impediments to the development of British agriculture." Well knowing that there are very many persons, and perhaps not a few in this room, who entertain a high regard for that kind of mystic feeling which has been supposed to exist between landlord and tenant, partaking of the character of a family connection, and differing myself as to the soundness of such a *liason*, I am desirous of making a remark in the outset, which may obviate the misapprehension to which I might otherwise be subjected. Having given the question long and serious consideration, I am perfectly convinced that the cultivation of the soil can never be carried on upon an extended scale so successfully as when the parties to that cultivation consist of the three classes, independent in respect to their rights, but mutually dependant upon each other as members of a body, united for one great purpose—namely, the landlord, the tenant, and the labourer. There are persons who indulge in the Utopian notion that if every man tilled his own land the earth would become a sort of terrestrial paradise; but my observation and experience by no means lead me to the conclusion that, taking the mass of mankind, *owners* of the soil would be better farmers than occupiers being tenants. Nay, I believe that in every walk of life the *necessity* for exertion is the great stimulus to industry, and that our natural proneness to ease and indulgence would, in the absence of some strongly exciting cause, be a great drawback to the exercise of our mental and physical faculties. If, therefore, I should be found making any remarks upon the relative position of each of the classes alluded to which may seem discordant, it must be considered that such remarks have reference only to some points in their connection, which I may deem unsatisfactory, and not directed against the utility of the whole collectively. I will now proceed to bring before you *some* of the practical impediments to the development of British husbandry, beginning with those which have reference to the landlord. However surprising it may appear, that those who have possessed within themselves the power to remove obstacles should permit their continuance, it is nevertheless true that the nature of the tenure by which landed property is held to a very great extent forms a serious impediment to improvement. Landowners doubtless have not felt the evil so strongly, because the disinclination to let land upon any other terms than that of tenancy from year to year has rendered the inconveniences less manifest to them. But when we reflect how large a proportion

of the landed property of the United Kingdom is held by tenants for life, or upon lives—by trustees, under settlements not having the power of leasing—by lay and ecclesiastical corporations, empowered to let only for very short terms—by trustees for the benefit of creditors, and by mortgagees, only enabled to let from year to year, not to omit copyholds, and the property of minors and incapacitated persons under the management of the Court of Chancery, we need scarcely be surprised that agriculture has not made the advance that it might have done. That the evils arising from the nature of the tenure and its consequent injury to property is not imaginary is clearly shown by the exertions which have been made from time to time to alleviate them. In the early part of the reign of George III. (nearly 80 years since) an act was passed to enable the proprietors of entailed estates in Scotland being tenants for life, to charge the estates with money expended upon improvements, such as draining, road-making, and the erection of buildings. Within the present reign only has the necessity for such powers been severely felt in England, and an act has been obtained through the perseverance of his Grace the Duke of Richmond and Mr. Pusey, giving the same powers, so far as drainage is concerned, to the owners of settled estates in England. The preamble of the bill affords a commentary upon the mischief proposed to be remedied. It states, "Whereas much of the land in England and Ireland would be rendered permanently more productive by improved draining, and, nevertheless, by reason of the great expense thereof, proprietors having a limited interest in such land, are often unable to execute such draining; And whereas it is expedient, as well for the more abundant production of food as for the increased employment of farming labourers, and the extended investment of capital in the permanent improvement of the soil, that such proprietors should be relieved from this disability, due regard being had to the interests of those entitled in remainder: Be it therefore enacted, &c., &c." The same facilities have since been afforded to Ireland. The manner in which the money, advanced upon loan by the government for drainage, has been taken up, affords ample evidence of the rapidity with which capital would rush in for the improvement of the soil, were reasonable facilities, combined with security, afforded. As regards estates, under settlement vested in trustees, numerous instances can be adduced (when of sufficient magnitude to warrant the expense) where the cost of a special act of parliament has been incurred, to obtain powers which would enable the trustees to make improvements which a necessary observance of the ordinary rules of law prohibited. Preferring at all times a practical illustration to the mere assertion of opinion, I may mention that, at a meeting recently held in Norfolk, Sir John Boileau, in speaking of draining, observed, "It was said to me the other day—Why do you bush drain? Now I will tell you why. I do not approve of it. I am an advocate for deep and proper draining; but, only four years since, upwards of 600 acres fell at once into my hands, in a very deplorable state, and much as I wished to put it as rapidly as possible into good condition, I felt, *with an entailed landed estate*, and a large young family, I could not do so immediately without an outlay of capital, which as it did *justice* to the land, must do *injustice* to them." The owners of millions of acres labour under the same disability. It has been recommended, after the most careful inquiries and mature deliberation, to convert tenures for lives, whether under corporations or otherwise, into perpetuities; it having been declared that this species of tenure afforded a serious obstacle to agricultural improvement. The evils of copyhold tenure have been so severely felt as to induce a very general demand for their enfranchisement. A "*Copyhold Enfranchisement Society*" has been established at Wolverhampton, and which has been brought into existence by the injurious effects of this species of tenure; the evils attendant on which are thus described by the report of the commissioners on real property: "But the great evil which is universally experienced where this tenure prevails, arises from the check to improvement occasioned by the conflicting rights and interests of the lord and tenant. These directly interfere with the profitable enjoyment of the soil, and materially diminish the public wealth." "The arbitrary fine due to the lord in most manors on descent and alienation, has a direct tendency to *discourage agriculture*, and to prevent the *erection of buildings*. This fine is usually considered to be the amount of two years' improved value of the premises at the time of the admittance of the heir or alienee; and where several are admitted as joint tenants, a further claim is made, by reason that the tenancy embraces more than one life; and the principle on which the fine is to be calculated, in such a case, remains unsettled. The payment to the lord, according to the improved value, is not merely a fixed share of the profits of the soil, or any proportion of the value of the fee simple, but *a tax upon the capital of the tenant, laid out in improvement*. The tenant is unwilling to submit to such a tax when he can avoid it, and accordingly there is a great indisposition to build houses, or otherwise expend any considerable sum upon land subject to such a burden. The land *remaining unimproved*, no benefit accrues to the land. It may be observed that, wherever there is a subdivision of the rights to the profits of the same land between different individuals, although the parts are necessarily equal to the whole in legal interest, they are by no means so in actual value. With respect to copyholds, the benefit accruing to the lord from his rights over the copyhold tenement, bears no proportion to the injury they occasion to the tenant; and a change of the tenure, whenever it can be effected, will be for the benefit of both. Improvement is likewise seriously checked by the rule, that a copyhold tenant cannot grant a *lease of his tenement for more than a year* without license from the lord. Even if the lord is willing to grant a license on reasonable terms, it often happens that he has only a partial estate in the manor, and the license determines with his interest. By this restriction, the remainderman may be prejudiced, instead of being protected; for if a *valid lease* could have been granted, the tenement would *probably have been improved*, and the subsequent fines upon descent and alienation proportionably increased." There is, however, one effect which would

recommend it to some, and especially to my friend, Mr. Hutley. It is stated in the same report—"In consequence of the law with respect to timber, generally speaking, no young tree is allowed to stand on copyhold land; and there is a common proverb that 'The oak scorns to grow, except on free land.' It is certain, that in Sussex, and in other parts of England, the boundaries of copyholds may be traced by the entire absence of trees on one side of a line, and their luxuriant growth on the other." In Ireland, where by far the greater part of the landed property is engulphed in a slough of legal difficulties, it has been recommended that facilities should be afforded for enabling owners, who may be desirous of so doing, to dispose of, or transfer a portion of their property to disencumber the remainder, and that the guardians and trustees of incapacitated persons should be invested with more ample powers of leasing. I am of opinion that it would greatly conduce to the interests of the parties themselves, and would certainly operate advantageously in a national point of view, if all parties to whom the management of estates is entrusted were empowered to lease land used for agricultural purposes upon the most beneficial terms. By this course the tenant would be protected, and the property would come into the hands of reversioner or future possessor (be he who he may) in good condition, instead of the state of poverty and dilapidation now too often the case. I consider all these restrictions and impediments as calculated to seriously reduce the value of land, and hence as highly detrimental to the interest of the proprietor; and it is marvellous that the system should be perpetuated whilst the parties who are the sufferers have in themselves the power to alter the law. Need we be surprised that by the continuance of such a suicidal system, capital should be driven to seek employment in trade, in commerce, in manufactures, nay, in the most visionary speculations at home or abroad; although under other and more favourable circumstances, easily attainable, it might be securely invested in the improvement of our native soil, and in the employment of the right arm of our national strength—our working population? It is not less strange that the present state of the law in reference to the non-removal of agricultural fixtures should have been permitted to continue; whilst the courts of law, with a view to the encouragement and protection of trade, have granted privileges which must necessarily operate to increase the value of the land so occupied. A report, recently published by the Society for the Improvement of the Law, has clearly and forcibly pointed out the injury to the landlord by the existing rule of law; that "everything once attached to, or embedded in, the land, belongs to the person entitled to the land in the same manner as the land itself;" and recommends not only the extension of the rule now applied to trade-fixtures to agricultural fixtures; but an enlargement of it, so as to permit the removal of "anything whatever which he placed in or on the land," without injury to the reversion. This course, if adopted, as I have no doubt it will be, must be productive of material benefit to the landowner, and tend to enhance the value of land; whilst it cannot fail to give confidence to the tenant in expending his capital upon such improvements. On whatever side we look, the keen-sightedness, and, I might say, the sense of justice of men engaged in other pursuits is much more forcibly displayed than by the owners of the soil. In all valuations for land required for railways under the Land Compensation Clauses, compensation is made to the tenant for unexhausted improvements; whether draining, bones, or other artificial manures. Why then, nay, *how* can the landowner withhold such a measure of justice from his tenants? I am aware that any reference to Ireland in respect to the question of security to the capital of the tenant may not be deemed precisely analogous to our case; but the information collected by the commission, over which the Earl of Devon presided, is so pertinent that I cannot refrain from quoting a few words from the report:—"The importance and absolute necessity of *securing* to the occupying tenants of lands in Ireland some distinct mode of remuneration for the judicious permanent improvements that he may effect upon his farm, is sustained by a greater weight of concurrent evidence than any other subject which has been brought under the investigation of the commissioners." And it is curious to observe what a large proportion of the witnesses examined gave evidence upon points bearing entirely upon the principle for which we are now contending. I find, by a reference to the report, that of 303 witnesses who spoke on the subject of tenants' improvements, 14 said that "landlords should advance money for or make improvements," 15 recommended that "power should be given to raise money on entailed estates for improvements," 47 recommended "that leases be given to tenants to encourage improvements," 20 were of opinion "that compensation should be secured *by law* to tenants for improvements," and 146 *contended* "*that tenants on ejectment, or on the expiration of their leases, or on leaving their farms, should be paid for improvements.*" Thus, setting aside the details, there is no difference of opinion either in Ireland or England upon the principle of security to the tenant. I doubt not it will be thought strange that I should allude to game as an obstacle to improvement directly affecting the landlord; I am nevertheless fully persuaded that it is properly ranged under this head. In support of this view, I will refer to an essay "upon the evils of the game laws" for which a prize has recently been awarded by the East Lothian Anti-Game-Law Association, to Mr. John Chiene Shepherd. It is with great pleasure I embrace this opportunity of recommending this essay to your perusal. It is written with much fervour and perspicuity, and cannot fail, if widely disseminated, to produce an effect in correcting this grievous abuse. This gentleman says, "The landlord by the reservation of the game establishes, at the very outset of his connection with his tenant, two opposite and mutually destructive rights over the same farm. No doubt there is a statement of some sort put forth, a sort of honourable profession held out, that the tenant shall not be injured by the game, that it shall not be allowed to increase so as to do damage, and so forth. But why is not such a clause introduced into the lease? why merely in the illusory and impalpable and oblivious form of verbal profession? Why is it so uniformly

and steadily and carefully refused to allow the insertion of such a written condition? If the contract is so strictly a commercial one between the parties, that the tenant requires to be tied down, as he is at all points, by the most stringent clauses, and by a variety of special laws made to suit the case, to prevent the most distant possibility of his ever infringing upon the rights of the proprietor, why does it happen that the landlord is allowed by law, nevertheless, to infringe indefinitely on the rights and property of the tenant, even to his total ruin? Why are the whole means and property of the tenant thus laid open to the encroachment and subject to the irresponsible power of the landlord? What sort of commercial transaction is this, where a certain kind of property is hired, subject to the condition of being rendered of no value to the hirer, if the proprietor chooses?" Is it possible that the reservation of a privilege which enables the landlord to "infringe indefinitely on the rights and privileges of the tenant, even to his total ruin" can fail to reduce the value to let of a farm so exposed? Can it be believed that a tenant will not take into account so serious a draw-back to the full enjoyment of the land when he seeks to hire the estate? That the evils of an abundance of game are neither imaginary nor trivial has been proved beyond question by the evidence given before the committee of the House of Commons on the game laws. Mr. Shepherd, the author of the Anti-game-law Essay, says, in reference to a farm in Scotland, "It is disagreeable, and it is perhaps unsafe, to come much nearer home with our cases. But a very ugly one, which has just occurred in the county where I write, I cannot refrain from alluding to, though it is but right to say that I take upon me this freedom without the knowledge, and most probably without the approval, of the tenant. The case, however, is now so well known, that it may be said to belong to the public, whose rumour is as follows:— 'Last year this tenant, on whose farm the game is said to be increasing rapidly, had the injury done to his crops valued, and the damage for that year was reported to be somewhere about 400*l*. This year, as the evil was still more formidable, and his case evidently one of ruin sooner or later, if matters were allowed to go on in their present fashion, he requested his landlord to allow arbitrators to be appointed on both sides, to ascertain the amount of his loss, which request was not acceded to by the landlord. He then selected three tenant farmers from three different estates, people of character and condition, and requested their opinion as to the amount of his loss from game for this year, 1847. Their opinion is, that this year his loss from game amounts to above 820*l*. Report farther says, that the landlord still refuses compensation." Let us suppose that a person, having a mill and a stack of granaries to let, were to stipulate to keep a reasonable quantity of rats and mice, and there being no covenant in the lease or agreement to prevent him, were to increase the number *ad libitum*, would any reasonable man be found to give a full rent for premises subject to such a nuisance? and yet the position of the tenant whose farm is overstocked with game is certainly not a whit better. In proceeding to remark upon the "practical impediments" to improvement which affect the tenant-farmer, it should be borne in mind that he is more or less affected by all the evils which have been pointed out as operating to the disadvantage of the owner of the soil, and in addition to these a series of impediments peculiar to his own position. Whilst I am free to confess that in many, too many, instances the fault rests with the cultivator of the soil himself, still I cannot refrain from observing that a vast measure of obloquy is frequently cast on him which he by no means deserves. It is but too common a practice with mankind to draw their conclusions from superficial observation; and hence he who, perhaps, deserves pity rather than blame, labours under an unjust and unsound imputation. In passing through the country where the cultivation is bad and slovenly, the buildings and fences dilapidated, the appearance of the cottages ruinous and miserable, the children of the occupants exhibiting all the evidence of poverty and want, how common is it for the traveller to dilate upon the want of industry and intelligence of the farmers, and to enlarge upon the plentiful crops which might be produced, were the land drained, well tilled, and a better system of management pursued—to describe the happy consequences which would ensue to the labourers from such a course as is exemplified in Lincolnshire, or some other well-cultivated county—and to end by ascribing the necessary importation of foreign grain wholly to the mismanagement of the farmers, who might make the soil of the United Kingdom produce one-third, or even one-half more than it now does! Were this superficial observer to make a careful inquiry into the circumstances, he might, perhaps, learn that the land of which he is speaking, though of fair quality, was poisoned with water, which could only be removed at a considerable expense in draining—that the hedge-rows were stocked with ash and other trees, which could not be touched, not even shorn of their branches—that the buildings were extremely dilapidated, and the crops were overrun with game from the neighbouring preserves—that the land was rack-rented to meet the urgent necessities of a spendthrift tenant-for-life dropping into years, and who possessed no power of leasing or entering into an agreement to afford compensation to the tenant for unexhausted improvements—who felt no interest for, or perhaps was at variance with, the reversioner, and hence possessing an estate almost more worthless than a tenancy from year to year—was determined to get all he could out of it, and not outlay a shilling in its improvement. This is no imaginary case: I myself have known such a one. It could not be expected that, under circumstances such as these, a tenant should be found so reckless of his own interest as to invest his capital in the improvement of the estate of another without security. In the case stated, however, the fault does not rest with the owner of the estate; but there are millions of acres in this kingdom over which the landlords *have the power* of affording security to the capital of the tenantry, but refuse to give it. "Habit," it is truly said, "becomes second nature—slaves have been said, after a length of time, to hug their chains; and men may hold farms on a tenancy from year to year without protection

of any kind, until their very dependence may become a source of enjoyment. Be assured that feeling is a morbid one, and perfectly uncongenial with the British character, which shall prefer dependence to *in*dependence. I consider it a species of monomania, which is becoming rapidly dissipated under the powerful influence of enlightenment and intelligence. Be that as it may, however, capital delights in security: it can flourish in full vigour in no other atmosphere, and until ample security is afforded it, it will not be found freely engaging in the cultivation of the soil. The want of security to capital, therefore, I hold to be one of the most, if not *the* most serious "impediment" to agricultural improvement. In the Report of the Society for the Improvement of the Law, recently published, it is proposed that the restriction to the removing agricultural fixtures is an *injustice* to the tenant-farmer; and I have no doubt that this evil will be remedied. This may in some degree remove one "impediment" to agricultural improvement—the want of proper buildings. This advantage, however, will be of a very limited character unless accompanied with the larger and more important measure of security for compensation for unexhausted improvements. In the report in question some valuable and important principles are admitted, which must lead to a better understanding of this subject—all that we believe to be necessary to effect the required change. It is distinctly laid down in that report that the *usufruct* of the land is a chattel interest, and should in every respect be treated as such. It is further stated, that "in point of value and perfection of title, chattel interests now differ from freeholds only in duration." This places the title and interest of the tenant in his occupation upon high grounds, and I feel most perfectly convinced that with due regard to the point that proper care be taken of the chattel, so that it be not returned in a worse state, the more extensive the right enjoyed by the tenant the more advantageous will the result be to the landlord. Another serious impediment to improvement will be found in the obsolete conditions prescribed to farmers in respect to the cultivation of the land, most appropriately yclept "clogging clauses," from their clogging and impeding the progress of the farmer at every step. Although it must be admitted a change is taking place in the character of these conditions, still I fear the progress is but slow; nor will it be rapid until the agents of landed proprietors shall feel the advantage of adopting a more liberal and enlightened system than has hitherto been their practice. Another "impediment," and more serious than is generally believed, will be found in the continuance of small inclosures, wide hedge-rows, thickly set with timber trees, especially ash; and which may be seen in some districts forming complete avenues, and extending their roots and branches half across the field. Ten per cent., or ten acres in a hundred, wasted in hedge-rows, is by no means uncommon, some of the evil consequences being the destruction of the turnip crop within their reach, the want of air and light to the crops, exhaustion of the soil by the roots, the harbouring birds and insects, and the loss occasioned by the frequent turning of the cattle in tilling the land. This last matter is so important that in all valuations of land taken by railways, if the fields are so intersected by the railway as to occasion more frequent turnings in tilling it, an increased amount of compensation is allowed. In pointing out, however, those "impediments" to improvement, over which the tenant has no control, we must not forget that there are some for which he is accountable, and the remedy for which rests wholly with himself. Amongst these may be named one of most common occurrence, namely, an inordinate desire to possess a larger-sized farm than he possesses the capital to manage with ease. This is a serious "impediment to improvement," inasmuch as with an inadequate capital business cannot be conducted advantageously, and many farmers would prosper in a small occupation with an adequate capital, who drag on for a time and become utterly ruined in a farm of too large extent. The want of a more enlarged and comprehensive system of education has been, and is, a serious "impediment" to agricultural improvement amongst the tenant-farmers. In making this remark I do not attach any especial blame to them as a class; but neither the individuals to whom the education of farmers' sons has been entrusted, nor the public at large, have given that serious consideration to the subject which it demands. In all professions and trades it has been deemed necessary that a system of education adapted to each should be pursued; but to fit a man for that pursuit, which involves the necessity of a knowledge of the operations of nature in a greater degree than almost any other, little more than bare reading and writing has been deemed necessary. Until within these few years no facilities have been afforded for giving instruction in those branches of science which are peculiarly necessary to form an accomplished farmer. I am, however, glad to notice that some schools have been recently established in which especial attention is given to those departments of learning which are deemed essentially requisite, and the Agricultural College at Cirencester will, I hope, be established as an institution to which the youth of this country may resort, and acquire distinctive honours for assiduity and talent displayed in the acquisition of agricultural knowledge. It is, however, highly desirable that the most efficient means should be taken, using a popular phrase, "to bring agricultural knowledge home to every youthful farmer's door." I have frequently suggested as the most efficient and ready means of giving a better education to the rising generation of farmers, that an appropriate system of instruction, embracing the use of good elementary works on the several sciences bearing on agriculture should be introduced into the schools in which the sons of farmers now receive their instruction. It is somewhat extraordinary that the same idea has been broached to our brethren on the other side of the Atlantic. In the appendix to a report on agricultural education, which I extract from the "Transactions" of the New York State Agricultural Society's "Journal" for 1844, Mr. Greig expresses himself in the following terms: "That a knowledge of the theoretical and practical details of agricultural science should be diffused amongst the youth of our land, is unques-

tionably highly desirable. The importance to the future farmer of such a thorough and minute acquaintance with the details of his profession as may enable him to accomplish the highest practical results, with the least expenditure of time and material, and in the most direct, judicious, and efficient mode, can scarcely be over-rated. This knowledge can only be acquired by the union of practical experience with scientific investigation and research. And where can the elements of the latter be more readily found and successfully prosecuted than in our common schools? It may probably be safely assumed that nine out of ten of those who are in the habit of attending these schools, in the rural districts, are destined to become practical agriculturists. Why, then, should not more ample and systematic provision be made for such a course of study and of education in these institutions as shall meet the requirements of this large class of pupils, especially when, by the adoption of such a course, the interests of the remaining pupils can in no respect be injuriously affected?—a course of study which should prepare those for whom it is more particularly designed for an enlightened and systematic cultivation of the soil, with the view of obtaining the highest and most permanent rewards of labour and industry, while it would exclude no single branch of science necessary to success in any other profession, trade, or calling. The practicability, then, of uniting elementary instruction, in our common schools, with agricultural science, and of so combining them as to produce results eminently favourable to physical, intellectual, and moral culture, has been amply demonstrated in the educational institutions of continental Europe. Is there anything in our institutions, our civilization, our societies, which should induce us to doubt the full success of the experiment here? Are we not eminently an agricultural people? Are we not provided with every facility in our school—direct organization—for the practical adoption of a scheme which commends itself unhesitatingly to our most mature judgment, and which alone can give to our rising millions that sound and useful knowledge requisite to enable them adequately to fulfil the great mission with which they are entrusted?"

I now come to the subject of game as another "impediment" to improvement, bearing directly upon the tenant-farmer. I endeavoured to show in an earlier part of my statement, that an excess of game was positively detrimental to the interest of the landlord, by reducing the value of his land; and I shall now proceed to show that where the landlord obtains a rent equivalent to the ordinary value of the land, that an excessive quantity of game is highly injurious to the tenant, and hence an "impediment" to improvement, so far as he is concerned. Sir H. Verney, a Buckinghamshire proprietor, stated some time since, at a meeting of magistrates in that county, that "some occupiers were especially injured by the game preserves. Those who held land in districts where the game was in great abundance, and where, consequently, the temptation to poaching was so great as not to be resisted, had especial reason to complain of the operation of the game laws. He had been informed on good authority that the destruction occasioned by game amounted to at least one-fourth of the whole crop in Bucks: there were districts in that county in which one-fourth of the crops was consumed by game. Nor was that all of which the farmer had to complain; for besides this serious loss he had the increased county rates to pay, and to keep the poacher's wife and family in the Union poor-house whilst he lay in gaol. The farmers, in fact, were made to pay towards the preservation of that they most wished to see destroyed." Another individual, whose general political leanings are said to be in favour of proprietary influence, says that "the breed of these animals to the extent to which it has been encouraged in Cheshire is beginning to excite public sympathy towards those who are really suffering. On one estate 300 brace of rabbits are destroyed weekly, besides a large number of hares: and when it is moreover told that they are carried to the nearest market, and made a large profit of by the owner of the estate, it is no wonder that public sympathy has been enlisted, and particularly so when several of the tenants have been obliged to quit their farms because of the destruction created by the game, without adequate compensation for the loss." A farmer near Clare, in Suffolk, is reported to have declared that cases were not wanting where the loss to the farmer amounted to more than his rent. At the time he spoke of, more than half the convictions in Suffolk were under the game-laws:—"Many tenants in —— parish are in a state of insolvency, and solely from the damage done by game." Mr. Beasley, whose farming has been highly eulogized by the Duke of Rutland, stated on oath "that some estates he had seen were a disgrace to the proprietors; that he had recently counted in one field eighty-three hares; and to keep these was equivalent to the support of above twenty sheep. For his part he would not keep them for any landlord in existence; and he would ask whether it was common honesty to expect any man to keep that quantity of game for his landlord?" Another farmer in a district where the poor-rates and other taxes are high, declares that his "sufferings from game alone amount to more than five times all his taxes put together." Another, whose whole rent amounted to only £212, "had in one season his wheat crop alone damaged to the extent of £260, independently of the destruction of his green crops." Another declares that "in a farm he formerly possessed, he lost £150 by game yearly, and that he was obliged to give up the farm in consequence." Another tenant, named Sewel, states "that his losses from game some years were estimated at £800." Mr. Chambers, a tenant, who lays out about £1,000 a-year for artificial manures, stated to the committee that "last year his loss from game amounted to *as much*." Another witness declared that "the game, estimating its increase by the numbers annually killed on the grounds, had, *during the currency of his lease*, multiplied five-fold; and that in the instance of hares, the annual numbers killed on the lands farmed by him had risen from 500 to 2,500."

There are some "impediments" to improvement which have immediate reference to the labourer. Of these I will first mention the want of education in general, and especially of instruction in the several operations of labour

which he is called upon to perform. However much some persons may be disposed to think lightly of the general question of educating the labourer, I apprehend there is no master but will admit that there is a great difference in the mode in which strength is applied in the performance of any operation of manual labour, and that the superiority of one labourer over another is not merely the result of naturally superior intellect, but of acquired experience. If then, this experience were communicated by instruction at an early period, it will scarcely be doubted that the youth in gaining the advantage of such instruction, would much earlier become what is termed an experienced workman. This is exemplified frequently in cases where the lads have beaten the grown men in a ploughing match. That labouring men have not the benefit of useful instruction, and acquire any knowledge they possess merely by accident in the undirected exertion of their own intellect, is but too manifest. That want of skill in using their mental faculties, and hence their strength, to the best advantage is a loss to the master will not be denied, consequently the inference is obvious that it must be a "positive impediment" to improvement. The want of residences convenient to the field of labour is another "impediment," inasmuch as the distance the labourer has to travel seriously impairs his bodily strength, and renders him incapable of performing the amount of labour he would otherwise be capable of. This over a great extent of country cannot be calculated at less than 10 per cent. upon the amount of wages paid. The law of settlement, as it exists at present, is another serious "impediment" greatly instrumental in producing the evil last mentioned, tending to depress the energies of the good labourer, by limiting the field of his labour, putting him in an unfair competition with the inferior labourer, and dragging him down to the same level. The subject was discussed before the committee of this club some time since, and the proposal for altering the present law of settlement met general approval. The grievances resulting from that law have not decreased during the time that has since elapsed, and the desire to make the poor-rate a national charge is, I think, gaining ground. The following extract from an early report of the Poor Law Commissioners sets forth some of the advantages which would result from the alteration of the law of Settlement:—"With settlements would go removals, labour-rates, and all the other restrictions and prohibitions by which each agricultural parish is endeavouring to prevent a free trade in labour, and to insulate itself by a conventional cordon, as impassable to the unsettled workman as Bishop Berkeley's wall of brass. There would be no longer a motive for preferring in employment the men with large families to them with small, the married to the unmarried, the destitute to those who have saved, the careless and improvident to the industrious and enterprising. We should no longer have these local congestions of a surplus, and therefore a half-employed dissolute population, *adscriptus glebæ*—some driven not by the hope of reward, but by the fear of punishment, to useless occupation, and others fed on condition of being idle; character would again be of some value to a labouring man. Another advantage, much smaller than the first, but still considerable, would be the diminution of expense; a considerable sum would be instantly saved in litigation and removals, and we might hope to save a still larger sum by substituting the systematic management of contractors and removeable officers for the careless and often corrupt jobbing of uneducated, unpaid, and irresponsible individuals." Notwithstanding that I have adduced the subject of game as being a direct "impediment," both in regard to the landlord and the tenant, I believe that the evil consequences are increased in an enormous ratio as regards its effects on the labourer. I shall here again refer to the Anti-Game-Law essay before quoted for a graphic description of the moral degradation of the labourer, and the evil results to the tenant-farmer from the meretricious gratification of an inordinate preservation of game:—"In one season in the small county of Bedford, among 201 commitments for various offences, 143 of these were connected with game; in the county of Suffolk also, more than one-half were for the same charge; in Buckingham there was one-third; and in several considerable sections of England it appears that convictions under these acts constitute more than one-half of the whole list. In England and Wales during the year 1839, there were 2,642 convictions under the game-laws. This number is stated to have increased annually and rapidly ever since, till, in the year 1843 (the last year for which returns are given in the Report of the Committee), no less than 4,529 convictions for game-law offences took place, and in 1846 I understand the number rose to 5,000. These returns, too, are acknowledged to be very imperfect; those from many counties not being completed, and that of Middlesex not included at all. The average fine of this host of cases is stated to be about two pounds, and the medium period of imprisonment nearly two months. * * * * Now although in such lists of convictions as those above given nobody can doubt that many of the penalties fell on very worthless and reprobate characters, there yet is as little doubt, from the wholesale and summary way in which most of these convictions take place—almost always on the evidence of gamekeepers and their assistants, the judges being very often the proprietors of the lands on which the offences have occurred, and the witnesses their own servants—that instances of horrid cruelty are constantly occurring. That this is really the case in very numerous instances is proved by the testimony of the Under-Secretary of State. And what else could be expected from permitting every excited and hot-headed devotee to game preserving, young or old, who possesses a certain number of acres, to sit as justices in their own cases—from actually permitting the prosecutor to act as judge? How could it possibly happen otherwise from such an absurd and cruel arrangement? Numberless comparatively innocent and well-conditioned individuals are hurried to crowded gaols and deeply injured thereby, not only in their health and in their families and good name, but permanently deteriorated in character; for we know that just as certainly as the character can be educated, improved, and elevated by good society, it is degraded and debased and corrupted

by bad society. And when at length such comparatively innocent individuals originally, are released from their long confinement in prison, and find the family they were once proud and happy to live in and labour for now reduced to the state of wretched paupers in the workhouse—their own characters utterly broken, their best hopes of life gone—there is, indeed, nothing wonderful in the transformation, if, under circumstances, and for such trivial offences—maddened by cruelty, confounded and degraded in all their feelings—individuals of formerly good purpose and conduct surrender themselves to courses the most desperate and abandoned." No man who has the misfortune to be situated in the midst of a country where the game is strictly preserved but must feel how correct is the picture here drawn. There is no subject which reflects so much discredit upon the character of our country as the fact, that we should be determined to secure our gratification at the cost of so much misery and suffering to our fellow-men. I believe, however, that the enormity of this mischief is working its own cure ; and should we have legislation on the question or not, the good sense and good feeling of the landed proprietors will lead them to remedy the evil. In looking strictly to the wording of the subject of discussion, it would not be necessary for me to do more than to show that the objects which I adduce as "practical impediments to the development of British husbandry" are really such ; but I do not think it quite foreign to the object we have in view to notice some of the objections made to an enactment which should secure the right of compensation for unexhausted improvements to tenant farmers. One of the arguments used is that compulsory compensation for unexhausted improvements would be "an interference with the sacred rights of private property ;" and Blackstone's Commentaries on the English law is referred to as an authority to show that a compulsory tenant-right, or, in other words, a compulsory compensation for unexhausted improvements, would be unjust and unconstitutional. The words of the learned commentator are—"So great moreover is the regard of the law for *private* property, that it will not authorise the least violation of it, not even for the general good of the whole community." I perfectly concur in the principle laid down by the learned writer ; but I hold, that so far from serving the purpose for which it is quoted, it confirms in the strongest terms the justice of our demand, that the capital of the tenant farmer should be protected. He speaks of "the regard of the law for *private* property." Is not the capital of the tenant, in his stock and crops, as well as in the soil for future crops, his private property ? If it be not, I know not what private property is ; if it be, then I have the learned commentator on the laws of England with me. Were we advocating an act of spoliation, the enriching one class at the expense of another, it might be well to set up the sacred rights of property. But the real fact is, that so far from being the aggressors, we are the despoiled ; it is *our* "*private* property" that is unjustly and unconstitutionally violated. The only apology for such a course of injustice is that assigned in the report of the Committee for the Improvement of the Law, that the existing rule prevailed at a period when "the relation between landlord or reversioner and tenant were very different from those which now prevail ;" and, as in the words of the report, "it is hardly necessary to point out how completely the state of things is altered," so neither can it be necessary to remark that this unjust and arbitrary rule should be made conformable to existing circumstances. It happens, however, unfortunately for the argument against compulsory compensation, that a custom now exists in some districts that compensation shall be made for unexhausted improvements in the shape of draining, lime, bones, and other manures. Now customs are regarded in the courts of law, and are equivalent to acts of parliament. Have these customs been deemed a violation of "private property ?" No such thing. Assuming the proposal of compulsory compensation to be an interference with private property, there is no country in the world where the rights of "private property" are made more subservient to "the altered state of things" than in this country. Private houses, gardens, property however "private," highly prized spots most dear and sacred, are dealt with by the legislature in the construction of railways, docks, and other improvements for the public benefit ; nay, even the ashes of our dead are removed from their resting-places, and our sacred edifices levelled with the ground, to open streets and make improvements for the general advantage. To talk of unjust and unconstitutional interference where the property interfered with is not injured, where hundreds of millions of money now in jeopardy will be rendered secure, when thousands and tens of thousands of our labouring population may be brought into constant employment, and the national weal proportionably advanced, is an argument which I think will not be listened to in the present completely "altered state of things." Blackstone, in describing the origin and nature of "waste," and the statutes passed upon that subject for the protection of the reversioner, thus describes one of the acts which would render the tenant in possession guilty of waste, he says :—"Exile or destruction of villaines, or tenants-at-will, or making them poor where they were rich when the tenant came in, whereby they depart from their tenures," was deemed waste. Our ancestors deemed such acts of injustice deserving of punishment. I am by no means an advocate for legislation upon matters of detail such as those to which I am about to advert, but when the laws are appealed to in answer to our demand for justice, and when our opponents do not hesitate to affirm that the interference which we ask is inconsistent with the policy of our law, I feel warranted in referring to the statute-book for the purpose of showing that at a period when the government of the country deemed it necessary to interfere with the "rights of private property" for the public benefit, it did not hesitate to do so. The 4th of Henry VII., ch. 19, which was re-enacted by the 5th of Elizabeth, chap. 2, and the 31st of Elizabeth, chap. 10, provided that for every twenty acres of land, the owner shall keep and maintain houses and buildings convenient and necessary for the maintaining and upholding of tillage and hus-

bandry, under forfeiture of half the profits yearly. The 7th of Henry VIII., chap. 1, enacted that if any lands which, on Nov. 12 of that year, 1515, or since, were commonly used in tillage, shall be inclosed or turned into pasture, all such lands shall, within one year, be re-converted into tillage, under the same penalty as the foregoing. The same act also provided for the restoration of all buildings necessary to husbandry which should have fallen into decay. The 5th of Elizabeth, chap. 2, enacted that any lands belonging to a house of husbandry which, between Nov. 12, 1515, and April 23, 1528, had been turned from tillage to pasturage, should be turned into, and kept in tillage for ever. The same act, and the 31st of Elizabeth, chap. 10, provided that all lands which had been eared, ploughed, or put in tillage for the space of four years, should be kept in tillage for ever, under a penalty of ten shillings per acre ; and the same statutes enacted that no conversion of lands from pasturage to tillage should be held to be a breach or forfeiture of any bond, covenant, or lease ; and that no person, under any circumstances, should convert land from tillage to pasturage." Gentlemen, I have now performed the task which I undertook. Let me say in conclusion that I hope the time is not far distant when the landed proprietors of this country will feel that it is their interest, as well as that of the tenant-farmers, that some alteration should be made ; and I feel persuaded that, if they do not come to this conclusion, the voice of public opinion will do that which it has often done before in this country, and which I should much rather see avoided—viz. force it upon them (loud cheers).

Mr. Baker said : Gentlemen, if an apology were due from Mr. Shaw, for his able address, I am sure it is still more appropriate in my own case when attempting to follow him. The subject is so closely connected with the interests of tenant-farmers that, without reference to the high standing of the gentlemen now before me, I feel that I ought to approach it with the utmost deference, and to treat it with all the ability which I possess. The view taken by the introducer of the subject is so opposed to present customs and to the present state of the law, that, as tenant-farmers, we can hardly expect to see so great a revolution in the relations of landlord and tenant effected suddenly. The work is one which can only be accomplished step by step, if it is to be accomplished by legislation ; seeing that the landlords of this country have the power of passing those acts by which they will be affected, our object can only be secured gradually. I cannot but regret that a class of men possessing so much intelligence as the tenant-farmers whom I see before me—a class of men representing an amount of property in this country which Mr. Shaw has assumed at £600,000,000, but which I estimate much higher—I say I cannot but regret that we, who hold so high a position in the country, both as regards property and intelligence, should have no representation whatever in the House of Commons, whereby we can make known our wants, or advance our interests in the manner in which they ought to be advanced. For this reason it has become necessary that a point of centralization should be established. In this Club we endeavour to collect the opinions of the farmers of the country ; and, by the instrumentality of those opinions, we endeavour to influence the minds of landlords, that they may be induced to concede that which, when properly explained to them, they cannot but feel to be right and just (Hear, hear). I will not attempt to follow Mr. Shaw through the large and voluminous evidence which he has brought before us—evidence of such a character, that it appears to me impossible to controvert it. I have observed, in effect, that the present custom having so long prevailed, a considerable time must elapse before such a revolution as that which has been proposed can be carried out. There is an old saying bearing upon this question which may here naturally occur to our minds. On a certain occasion, when some question arose between landlord and tenant, a landlord, notorious for the large amount of property which he possessed in this kingdom, and for the absolute sway which he exercised over it, said that he had a right to do as he liked with his own (Hear, hear). Now, what constituted that landlord's right to do as he liked with his own ? The right which he had in the estate that Providence had given to him, in connexion with the tenant who had the usufruct of that estate, for the production of the utmost amount of grain which it could produce. The tenant standing between landlord and labourer was to have the opportunity of expending that upon the property which could alone enable him to live. For what purpose, I ask ? That the whole community might be benefited ; that the largest amount of grain might be produced for the support of a teeming population. Now, taking this view of the matter, all these impediments have been brought before you by Mr. Shaw, and they cannot fail to appear to you of the utmost importance. Whatever tends in the slightest degree to diminish the amount of produce which can be obtained from the land—whatever tends to diminish the tenant's power of placing the labourer in his proper position—cannot fail in the result to be injurious to the landlord himself, to the tenant, and to the labourer. The utmost confidence should exist between the three classes who stand forward as owners, occupiers, and labourers ; and such confidence cannot exist where the existing arrangements tend to destroy it. Now look at the system upon which land is at present let. There are, especially, two kinds of occupancy. The one is that of the tenant from year to year, who can get nothing from the occupation of the soil but that which the law gives him by this precarious tenure. Another description of tenants are those who enter into contracts with landlords, with a view of realizing from the land the largest amount of produce which it is able to furnish. With regard to the first class, the law comes into full operation ; it is in their case most effective, because it provides that if the tenant, after having made up his amount of cultivation for the year, shall happen to offend the landlord, the latter shall have the power of giving him notice to quit on the 25th of March, and not only to quit the farm, but to leave all the capital which he has expended entirely at the landlord's mercy. That is one part of the law especially requiring alteration, and longer notice ought to

be given to the tenant. I have always held that one year's notice is the shortest period which ought to be allowed by law, in order that the tenant might look out for another occupation for himself and family, and not be under the necessity of selling his property at a great loss. Another crying evil is, that none of the buildings erected by tenants can be removed; that also is a point which requires alteration. It seems absurd on the face of it that if the tenant has erected a building he shall not have the power of removing that building on leaving the farm, if the landlord refuses to take it at a fair price; that is a principle of common justice and equity, and it is so deeply impressed on the public mind, that I am quite satisfied that if no other portion of the tenant-right be conceded, that at least must be conceded during the next session. The next point relates to money expended in the improvement of the soil. It is impossible, I admit, that a tenant can get back all which he has expended, but he ought to obtain a portion, such as draining and inorganic manures, which do not become suddenly exhausted, and other improvements of the like nature upon which an equitable calculation can be entered into. I now come to letting land under lease or agreement. Now, here the landlord steps in, and says—and let me say, that I think you will again find him stating in the House of Commons—that he has a right to dictate the terms on which he will let his land (Hear, hear); that it is for the tenant to measure the amount of injury which he may sustain by those terms in the amount of rent which he offers; and that if he offer a larger amount of rent than he can afford to pay, the fault will be his own and not the landlord's. (Hear, hear). Sir, I feel that if I were a landlord, possessing land under the present law, I should be exceedingly tenacious of diminishing, by any act of mine in the legislature, the power which I possessed, or of precluding myself from making such terms as I thought best, in making over property for the use of another for a certain number of years. I admit that the equity is quite at variance with the law of the case, and I have always felt that if a landlord knew his own interest, and were desirous of doing what was right and just to the tenant, and to the community at large, he would so arrange the terms of the agreement as to give the tenant the use of the land, with the utmost amount of freedom and to enable him to obtain from it the largest amount of profit, provided he did not injure the land itself. It can hardly be expected that, if tenant-right be established, and the landlord is made to pay for improvements, the tenant should not also be liable for any waste or injury which he may have occasioned. (Hear, hear). I am quite sure there is not a tenant farmer here who does not feel that, if during his occupation of land, any injury should have taken place, it would be right that the same remuneration should be made to the landlord, which he as a tenant asks for himself on account of his improvements. This is my view of the matter under consideration; and from what has passed in a higher quarter —from what took place yesterday at the meeting at which I was present, and where a resolution was placed on the books of a society of which I am a member, and over which his Grace the Duke of Richmond presides; knowing, I say, that the Duke of Richmond countenances this question, and is desirous of seeing tenant-right established, and that other members of parliament are also attending to it, and only wish to know what it is the tenant farmers require, I feel confident that an advance will be made, in the next session of parliament, towards securing this object. The motion to which I have referred is divested of the terms which have been so objectionable to many landlords—I mean the words "tenant-right." (Hear, hear). One landlord has observed that tenant-right means landlord's wrongs, and that therefore it cannot be conceded; but when landlords come to see that what is required is only an adjustment, they must feel that what we demand ought to be yielded. Now the resolution entered in the books of the society is as follows:—"That this society will promote, to the utmost of its power, a full inquiry by the legislature into the mutual interests and relations of landlords and tenant-farmers, with a view to the introduction of some measure for the regulation and equitable adjustment of the same." That is the position in which the matter now stands, and in that spirit will the question be proposed. It would be a work of supererogation for me to go over all the ground which Mr. Shaw has so well occupied; but there is one point upon which I think he is in error, I refer to his interpretation of a word in "Blackstone," where that authority is speaking of the tenant committing waste by removing a house or causing a villein to leave the estate. The word "villein" there does not, I conceive, mean a tenant, but a person, who, being attached to the estate, has no power of leaving it of his own accord. What is meant is, I imagine, that the tenant would commit waste by removing the labourer who ought to have been retained. As regards the question of tenant-right, let me say that the landlord can only be regarded as holding the land in fee, having no power to sell it to a foreigner. He is only a tenant of a higher order than the one who occupies, he is the tenant in fee for the time being; and such being the case, the legislature of the country can interfere with the land with a view to general improvements, for the benefit of the community at large; and such interference has in fact taken place through the imposition of taxes of a certain character, and through directions as to the manner in which the land must be occupied and cultivated. In the reign of Elizabeth, certain conditions were made imperative in consequence of many arable lands having been converted into pasture lands. The crying evil of those days was, that in consequence of corn being sold at so low a price, a great deal of land had been thrown into pasture; and the number of vagrants increased to such an extent that it became necessary for the legislature to enact that those lands which had gone into pasture should be reconverted into tillage, in order that labourers might be employed. I believe that to be the true explanation of the interference of the legislature at that period. There have, however, been more recent interferences; for example, in the late commutation of tithes the legislature not only interfered by defining how tithes should be paid, but by converting tithes into another description of property. There can, therefore, I think, be no doubt in the public mind that the legislature has a right in the case of the freeholds of this country, to enact any laws which shall tend to promote the benefit of the whole community. Let me congratulate you, gentlemen, on the circumstance, that by attending here to-night in such large numbers you evince that this question has taken a hold of the public mind, and especially of the minds of the enlightened agricultural tenantry of England, and I little doubt that the result will be the removal of those great impediments to the progress of British industry which have hitherto existed.

Mr. Latimore said: In the few minutes allotted to me I will not follow Mr. Shaw in his interesting details as respects the law in ancient times, but in treating of the present condition of the farmers of this country. Cases innumerable might be adduced in my own county—and in every county in England into which I go I find

similar ones—of monstrous hardship and oppression shocking the minds of agriculturists around. Sometimes there are sudden evictions, sometimes there is a great destruction of property by game, and sometimes there are religious differences between landlord and tenant, whereby the floating capital of the farmer is placed in abeyance; and cases of injustice do occur which, adopting a common phrase, may be designated as "legalized robbery." Your presence here to-night, gentlemen, affords additional proof that there are practical impediments to the development of British husbandry. Now the question is, What are those impediments? and before I touch upon them, let me just say I am very much delighted to find Mr. Baker, who preceded me, adopting so liberal a view on one part of this question. I rejoice that he has at length discovered that the farmers of this country have at present no representation (Hear, hear, and laughter). When I ventured to make an assertion to that effect some years back, it was considered a very wild one; but unfortunately I am unable to alter the opinion which I have so frequently expressed, that the British tenant-farmers of this country, in the absence of leases (and leases themselves only afford security for a given time; they give nothing at the end of the lease), have neither a legal nor a political existence (Hear, hear). On the former point Mr. Baker and myself concur; I hope he will keep progressing until he arrives at my own conclusion on the latter point (laughter). Gentlemen, I heard a remark made the other day by an intelligent commercial man in the city, which struck me as being highly important. He said, "I hear a great deal about the want of security for the capital of farmers. I do not understand your position; but this I do know—that, though in the course of a long life I have known many instances of men in humble circumstances rising to a high position in trade and commerce—nay, I have even known many instances of mechanics thus rising—yet I have not known any instances in which tenant-farmers have risen to a corresponding extent. There must be something radically wrong in your position; and I suppose you are now just beginning to find it out." Gentlemen, if the commercial men of the metropolis know this, how is it that the tenant-farmers themselves have been slow to perceive it? (Hear, hear.) However, I take your presence to-night as an evidence that you have discovered that something is wrong; and having done so, I trust your exertions will never cease until you have also found and applied a remedy (cheers). I venture to say there is not a tenant-farmer present who, in his midnight meditations, and sometimes in his morning dreams, has not felt that there is something wanting to give him that security to which, as a free citizen, he is entitled (Hear, hear). I venture to say that, in walking round his fields, every one has been deterred from the thought of improvement by the feeling of uncertainty; and I also venture to say that on looking forward to the close of life, as every good man must sometimes do, the question has often arisen within him, whether he has fulfilled his moral obligations to his family in being so supine upon the question which has assembled us here to-night. With respect to the laws of ancient times, I wish to make only one remark—namely, that it is as impossible that laws made in the feudal and barbarous times in question should be suited to the present day, as it would be to find the full-grown yeomen in this room to ensconce themselves in the clothes of their childhood (laughter). I will now mention a few practical impediments which I believe it is necessary to have removed. The first of these I take to be the want of a legal recognition of, and security for, the floating capital of the tenant farmer, who, as I said before, has at present no legal existence. The amount of capital thus employed has been variously estimated by different individuals. I will take it at a somewhat lower amount than those gentlemen who preceded me have done. I assume that it is £300,000,000 sterling; and I venture to say that there is no similar amount of capital invested in trade, commerce, or any other species of industry, which is entirely dependent on the will of others, and for which the owners themselves have no real security (Hear, hear). I know that many good landlords have long felt and regretted the insecure and unsatisfactory position of tenant-farmers. For instance, there was the late Earl of Leicester. He, feeling that this security was wanting, endeavoured to remedy the evil by giving long leases. He never belonged to the Royal Agricultural Society of England, and there was a reason for that. It was not that he did not wish well to agriculture: his own career contradicted any such assertion. I have it on good authority that he was applied to by Earl Spencer to join that society, and upon his enquiring of Earl Spencer whether or not it was intended to make it a principle of the association that security should be given to the tenant-farmer, he was told that it would be impossible to carry such a point amidst so much difference of opinion; and the Earl of Leicester actually refused to belong to the Royal Agricultural Society, when informed that the object was to draw out the energies of the British farmer, without, at the same time, giving him that security to which he was justly entitled. He felt, as I have long felt on this subject, that all those inducements which are offered to draw out the energies of the British farmer, and to lead him to invest his last shilling in the land, are, when unaccompanied with something further, bitter mockeries, tending to mislead a large and important class of men, and to make them indulge expectations which the subsequent results do not realize (cheers). I need hardly say that in putting forward this claim to security for the floating capital of the farmer, I am equally anxious that the property of the landlord should have a similar measure of justice. I am sure all good farmers will agree with me, that in seeking the preservation of our own property, we do not seek the spoliation of others (Hear, hear). The second impediment to which I shall call attention is to be found in the unwise trammels and restrictions now enforced as regards modes of cultivation, whereby the farmer is frequently probibited from pursuing that course which is most approved of by his judgment and experience. I think it is one of the greatest marks of the degradation of farmers as a class, that they should submit to sign conditions which they

believe to be prejudicial to their farming, and ultimately injurious to the land. I know there is at present no help for this; and when we are speaking of damages done to an estate by the removal of a tenant, as mentioned by Mr. Shaw, we must recollect that tenants were not so plentiful in those days as they are now. In these days tenants press upon tenants, and many absurdities and anomalies are perpetuated by this very struggle for existence. This, I consider, an additional reason—this very crowding of men upon each other to get possession of the land I consider an additional reason why these obsolete statutes should be repealed, and security given to the tenant. Men have at present no power to make terms for themselves, and on that account especially the legislature is called upon to step in, and do what is necessary and right. I may here just allude to a part of the report delivered on this subject by the Law Society, a report which I consider of great importance to ourselves as a class (Hear, hear). We are told that we are not very good lawyers, and that we ought not to meddle with these things (laughter). But the fact is, this Law Society has touched upon the right point. They say that the reason why these absurd customs still prevail, is that the laws have been made by landlords alone. That, certainly, accounts for the whole matter (Hear, hear). The report goes on to say that these laws were made under an impression that the landlord was a superior and the tenant a dependent. Now there can be no just terms made between parties, unless there be something like independence (Hear, hear). The parties to a contract must have something like a general similarity of interest in order to be able to agree upon fair terms; whereas the laws having been made by the landlord alone, the security given is confined to him; and the immense competition for land is an additional reason why the tenant has not been able to enter into a fair contract. The third impediment to the development of British husbandry which I shall here notice is, the fetters imposed by an unjust system of taxation, such as the malt tax; whereby the system of husbandry is deranged and a great loss of production, and consequently of wealth, is occasioned (Hear, hear). In the discussion of the malt-tax question in this club, it was shown that in Norfolk, where the four-course system was established under the superintendence of the late Earl of Leicester, an immense addition was made to the annual production of the country; so that Norfolk became remarkable for the quantity of barley made into malt, and for the number of cattle fed upon roots. But throughout the country the production of malt has not increased; and you will find, on examining the matter, that wheat is too frequently sown instead of barley, the cultivation of which has not increased in proportion to the increase of the population. At this time it is notorious throughout the country that two quarters of barley must be given for one quarter of malt. Now if any one will tell me that that is not an impediment to the development of British husbandry, I can only say that I should be very sorry to stand godfather to his judgment. This is one of the anomalies of the present period; and if it were not true, I should say it was incredible that British farmers would submit to it. There is another law which I must notice, and that is the law of copyhold, which is another remnant of the feudal system (Hear, hear). The evils of that law are more known as regards houses than land, but the principle is the same in both cases. The law fetters a party in making improvements; and if he do venture to make them he must pay the penalty of his rashness. I have been told by some landowners that the law is just the same for them as for the farmer, and that the fault rests with those who do not make better agreements. How stands the case at the present moment? A tenant of the Earl of Winchelsea is at this moment in Maidstone gaol. Mind, I am not about to defend that man's conduct; I am merely dealing with facts. That man has been put into gaol not for the violation of an agreement or for the breach of a lease, but for dilapidations and bad farming. By the law with regard to dilapidations the tenant is bound to prevent the land, during the period that he holds it, from going to waste. Observe, however, the landlord has no fetters imposed upon him to prevent the tenant's property from going to waste; and, more than that, he can take advantage of improvements and appropriate them to himself, by dissolving the tenancy with six months' notice; the tenant being further required by the law of fixtures to leave on the land any additions which he may have made to it. Now I maintain that any addition to an estate is a second estate (Hear, hear), and that second estate must justly be regarded as the property of the person by whom the addition was made. If the law recognizes the right of the owner of the first estate, it ought equally to recognize the right of the owner of the second (Hear, hear). Gentlemen, let me mention that a meeting has been lately held at Bilston, in Staffordshire, which you will find reported in the *Daily News* of this day, on the subject of the law of copyhold, the evils of which were there taken up in a spirit which will, I hope, be imitated by farmers generally. I will now say a few words on the subject of stock farming. I maintain that stock farming is the only basis upon which we can look for a profitable system of husbandry. Whatever prevents the rearing and maintenance of stock is a public calamity. On this subject I will venture to direct your notice to a very important article published in the Royal Agricultural Society's Journal, from the pen of Mr. Lawes. Many of you, I doubt not, have read that article (Hear, hear). I mention it because I happen to know the writer. He is a landed proprietor and a gentleman of high honour, who has devoted seven or eight years of his life to the study of chemistry—a subject, let me observe, in passing, upon which farmers are often very deficient. He has honestly given to the public the result of his investigations; and he confesses that, after all his experiments, he has come to the conclusion that stock farming is the best system. I will call your attention to an extract which I think very important. He says: "5lbs. of ammonia will produce a bushel of corn; which, at the present price for Peruvian guano, £5 per ton, will cost 10d. per lb. This is equal," he observes, "to 4s. 2d. for every bushel. To obtain this amount of ammonia by

means of stock, there should be an increase of about 28lbs. of live weight upon the farm; or in round numbers to obtain 1 ton of grain beyond the natural production of the soil there ought to be an increase in the weight of stock of 1,000lbs." He goes on to say, "that although it is expensive to feed stock, yet, after all, it is cheaper to do so than to use the chemical experiments." But what does this stock farming require? Why, it requires five times the amount of capital to grow corn by means of stock that is required in the case of artificial manure. (Hear, hear.) Five times the amount of capital of course requires a much greater amount of security; that security must be given by the Legislature: and the question which we have now to consider is, by whom is this security to be obtained? (Cheers.) I don't think the landowners, as a body, want it; though there are many good landlords who admit the justice of our claim, and will do something towards securing it. Neither do I think we have any right to expect land-agents to assist us in getting it. By the way, I have missed this year the annual lucubration of a little knot of gentlemen who met last year at the Old Bell, Holborn, for the purpose of discussing this question. (Hear, hear.) In spite of those gentlemen you are met here in goodly number; and I do trust that you will always treat the edicts of those gentlemen with the indifference and contempt which they deserve. My belief is, that if you leave this matter to the Old Bell, Holborn, it will toll the knell of your everlasting slavery. ("Hear, hear," and laughter.) I will merely observe, in conclusion, that the value of freedom in action has at all times been recognized and felt. Our great painters, sculptors, and poets could never have accomplished their immortal works if the mind had not been free. Taking human nature in the aggregate, we must, I think, arrive at the same conclusion. The agriculturist, in order to acquire excellence, must have a similar amount of freedom. Such being the case, I demand that the minds of the agriculturists should be set at rest before they are called upon to spend their last shilling in the soil. I feel assured, gentlemen, that you will not be wanting in your duty; I feel assured, that in asking for this security for your own capital, you will be taking the best steps to secure the property of your landlord; and that in obtaining such security, you will be obtaining that which will confer the greatest benefit on yourselves, and prove the brightest inheritance for your children. (Cheers.)

Mr. BODDINGTON said—I entertain a view of this question which I am anxious to place before the meeting. It is generally supposed that at present landlords, tenants, and labourers do not come up to the mark with regard to agriculture. Now it has been stated in the House of Commons, and we well know it to be a fact, that there is annually imported into this country, from Ireland, agricultural produce to the value of upwards £15,000,000; though the population of that country is to a great extent without food, and actually dying of starvation. We buy that produce with our manufactures; and, by so doing, we destroy the manufacturing capacity of the Irish: that is the reason why Ireland does not manufacture for herself. The question, then, arises—should we be thus dependent upon Ireland to the extent of £15,000,000 worth of food annually. The light in which I view the matter is this: Suppose it to be assumed that there is a demand in England for agricultural produce to the amount of £50,000,000 a year. If that amount is supplied in part by Ireland, the capital of this country will shrink from producing the whole amount, and find employment in something else. (Hear, hear.) And this brings me to a remark of Mr. Shaw, with respect to the diversion of capital from agricultural to other pursuits. To me it appears clear that, as a nation, we drive our capital unduly into certain manufacturing pursuits. These become bloated; a panic suddenly arises, and the manufacturers having made more goods than they want, more, in fact, than all the world could consume, they find themselves at length involved in ruin. (Hear, hear.) I consider, then, that the importation of food from Ireland has a great deal to do with impeding the progress of agriculture in this country. I believe that it arises in this way. In Ireland the relations which exist are totally different from our own. When the union took place they had not the same amount of rent; the whole system was, in fact, different (cries of "Question.")

The CHAIRMAN expressed a hope that the speaker would confine himself to the practical impediments to British husbandry.

Mr. BODDINGTON: I contend that the importation of Irish produce into this country is a "practical impediment;" and a further impediment is, I consider, the importation of foreign cattle. I hold these to be far more fundamental points than those which have been previously noticed. I think them of far more serious consequence to British agriculture than those other matters, which I hold to be rather of secondary and trivial importance. (Hear, hear, and "No, no.")

Mr. BELL said—I listened with all due respect to the lengthened observations of the gentleman who introduced this discussion. I think the gentleman who preceded the last speaker wandered quite as wide of the subject as the gentleman who has just been called upon to sit down. (Cries of Oh! oh!") I do not mean to say that gentlemen have wandered wide of the question of tenant-right, taking the literal meaning of those words; but I do say that they have wandered wide of the primary causes which affect the condition of the farmers of this country. (Hear, hear.) I do maintain that all that we have heard to-night about want of security for capital, and injury inflicted by hares and other animals, is as nothing in comparison with other evils to which the producers of English corn are subjected. (Hear, hear.) Sir, I regard the paper which we have heard to-night as a bill of indictment drawn against the landowners of England. (Cries of "No, no.") Pardon me; I do not stand here to vindicate the order of landowners; I only demand for them that fair play which the tenant-farmers, on this occasion demand for themselves. (Interruption.) If gentlemen will be patient I will prove my position. I say, let us understand on what principles we are to try this question, so far as the landowners of England are concerned. We live at this moment under the influence of free-trade principles; under the influence of that doctrine by which it is declared, that every man is entitled to buy in the cheapest market and to sell in the dearest. (Hear, hear.) I say that the landowners of England have as good a

right to do what they please with their property as any other class of property owners in this country—not more. (Hear, hear.) If it be deemed necessary to abridge the power exercised by landowners, in God's name let that power be abridged; but let the power of all other property owners be abridged in the same manner. If cases of oppression be proved against them, let them be punished; and if the laws which exist be not sufficient, let other laws be brought to meet the case. But then I say that the landowners of England have the same right to do what they like with their own property, as other classes of the community. It may be cruel for the landlord to reply to his tenants' complaint, by saying, "I did not compel you to occupy my property;" but there are many things to prevent the landowners of England from doing what they otherwise might. Within the last week Sir Robert Peel stood up in the House of Commons to defend the right of money-owners to take 8 or 10 per cent. for the use of money, thus coming forward in the spirit of the Benthamite philosophy, to declare that the usurer is a public benefactor (Hear, hear). Are we to see the usurer held up as a public benefactor, while the landowner is exhibited as an oppressor simply for enforcing the conditions which his tenant has accepted? (Hear, hear). We are living at present under the influence of a free-trade system, and as far as I can understand the spirit displayed to-night, a majority of the gentlemen present recognise the principles of that system (marks of dissent). Pardon me; while we have had many appeals this evening, they have all turned upon oppression on the part of the landowners; and I say, with all respect for tenant-farmers around me, that they ought to be careful how far they urge claims against the landowners, founded on the assumption that they have been guilty of systematic injustice towards their tenants (a voice "That was not stated"). It is quite possible that if the labourers of this country were summoned to give testimony, they might prefer against the tenant-farmers charges quite as grievous as those which tenant farmers prefer against landlords (Hear, hear). It may be that some of you are free-traders, and others protectionists, or, like myself, prohibitionists; but I tell you that what you want as a class is security of prices. A gentleman present has dwelt upon a statement that no tenant-farmer has ever been known to realize a fortune. I say that the reason why tenant-farmers have not realized fortunes is, that for a long series of years they have been denied security of prices.

Mr. WALTON: It has been tried.

Mr. BELL: It never was tried fairly in this country; you can secure remunerating prices in one form, by excluding competition with foreigners; in another, by enjoying the protection involved in an honest system of money laws. As regards the latter point, I would observe that the landlords of England, in common with the tenants, are at present exposed to the injurious demands of usurers and money-jobbers. It is against the men who demand 10 or 12 per cent. that we have chiefly to contend. Sir Robert Peel told you in 1842 that the farmers of England were entitled to 56s. In 1846 he told you that you were entitled to no more than you could get. How then can you cultivate the land with success? (cries of "Question"). I am very sorry to give offence to gentlemen who entertain free-trade principles (renewed cries of "Question").

The CHAIRMAN called Mr. Bell to order. He really thought they could not on that occasion go into the question of the currency, and other questions of a general nature; and he hoped that Mr. Bell would make his remarks as practical as possible.

Mr. BELL: If you tell me, sir, the value of money is not a practical question, I will sit down, and never again enter this room. Let any man go to his banker for money to carry out improvements, and he will then find that this is in reality a practical question. I maintain that, however desirable tenant-right may be, the great practical impediments to proper cultivation of the English soil are, defective and insecure prices, and the unjust action of bad money laws; and however distasteful such observations may be, I do not shrink from uttering what I consider great practical truths.

Mr. LATTIMORE explained that he had not meant to imply that no farmer had ever made a fortune, but that farmers generally did not make fortunes.

Mr. W. BENNETT said: The very excellent paper which Mr. Shaw has submitted to us to-day did credit both to his head and to his heart. At the same time, I am disposed to go a long way with the gentleman who has just addressed us; and if it be that gentleman's opinion that the usury laws are practical impediments to the development of British husbandry, I do not see how his declaring that opinion can be irrelevant to the question. Will any gentleman say that bad prices are not an impediment to good farming? (Hear, hear.) To me it certainly appears that they are, although I confess that this is a line of argument which was not contemplated here to-night. My friend Mr. Baker seemed to think that we are looking for a sort of revolution in asking for tenant-right; and he intimated that we must not expect to accomplish our object in a very great hurry. Now I do not think there is much danger of our proceeding too fast in that respect. I rather think that the great danger is that we shall proceed too slow, and we have been sadly too slow hitherto (Hear, hear). Mr. Baker also said that any act that might be passed could only apply to cases in which no agreement or lease existed. Now, if that be the case, I don't think our object is worth powder and shot. It would then be open to any landlord, in spite of tenant-right, to introduce into his agreement with his tenant a clause or clauses altogether illusory of the law; and the farmers of England will be told that they have got something, when in reality they have nothing at all (Hear, hear). What is the present state of the case? A large portion of the landlords of England act upon the great principle of "Live and let live." Between such landlords and their tenants there is no great feeling of dissatisfaction. Now if the bill did only what Mr. Baker contemplates, landlords of a different class, who care for nothing else but rent and are quite indifferent to the state of tenants and labourers, would remain wholly unscathed. I could never consent to the mere passing of a bill of so unsatisfactory a character (Hear, hear). I took the liberty of saying to my Lord Portman to-day in the Show-yard, "The more you look at the question, the more clearly you will perceive that any measure which is to give security to the tenant for the outlay of his capital must be founded upon a broad basis." I do not desire any interference with the general power of drawing up leases and agreements; but if the landlord wishes to impose on his tenant conditions which are mischievous to the country, then I think the legislature ought to step in (cheers). All laws should be made for the good of the community, and all laws are more or less restrictive in their nature; and to suppose that you have no right to interfere in matters of this kind, appears to me exceedingly unsound. On the subject of the usury laws, let me say I think that if ever a hook were put into the mouth of the oppressor, such a hook was applied in the old laws on the subject of money; and I think, further, that the breaking down of those laws was a departure from great Christian principles. I think the present laws on that subject are against every interest in a thousand ways; and with regard to the defence which the great man who supported them

attempted to make the other night, I hold it to be trash. I have no opinion either of him or his policy, and I never shall have after the cowardly manner in which he acted towards the agriculturists (cheers).

Mr. WALTON said—One of the greatest impediments to the practical development of British husbandry is a want of capital on the part of the tenant; and even where capital exists it cannot be applied, because there is no security. I was a farmer for ten years in the county of Essex, where I had a lease made between my landlord and myself; no lawyer, middleman, or red-tape-man having the least hand in it (laughter, and cries of "Question.") The question is this: Under the lease to which I was a party, I was to be paid for dressings, half-dressings, and all other improvements. I received a premium of £500, the lease not having expired; and obtained, besides, compensation for everything in the shape of improvement. (Hear, hear.) I merely mention this to illustrate how tenant-right, when obtained, may be of use to the tenant. (Hear, hear.) I do not think even a seven years' lease is sufficient to bring land into proper cultivation; and though I am entitled to two years' notice under my own lease, I do not think that affords me sufficient security. It will take a man who has a thousand acres of land seven years to get it into good cultivation. (Hear, hear.) Now, let me say, in allusion to some remarks which fell from Mr. Bell, that it is impossible for any man to deny that we have already made the test of security of prices. (Hear, hear.) In 1810 and 1812, the landed property of England was, I need not tell you, actually doubled. My own farm, which was then let for £400 a year, is now let for £800 a year. This is, I am aware, a hack story; but it is necessary to repeat it, in order to dispel the notion of security of prices. (Hear, hear.) In 1815 the war terminated; wheat having been previously to that period £40 a load. What was the state of things afterwards? There was a corn law, to secure and keep up prices. But what followed in 1822? (Hear, hear.) There was then a fresh law, by which it was declared that prices should not be quite so high as 80s. a qr. (laughter). So the matter went on; and will any man, then, tell me that the experiment of keeping up prices has not had a fair test from 1815 up to the present time? (Hear, hear.)

Mr. BELL.—What about the new money law?

Mr. BODDINGTON.—As regards the money law, my opinion is, that it is not at all applicable to farmers, but to improvident landlords.

The CHAIRMAN entreated the meeting not to occupy itself with the corn laws, and the abstruse question of the currency.

Mr. WALTON.—I should not have gone at all into the question of the corn laws, but for the observations of the gentleman opposite (Mr. Bell). I will only touch on one other point, and that has reference to the improvement of the labourers. I think that this can only be secured by task-work. The question on Saturday night should be—"What has this man earned during the past week?" Whether the amount be 10s. or 15s. a week, or any other sum, he should be paid according to what he has done. (Hear, hear.) If you do not pay a labourer according to his ability and deserts, you leave him no stimulus to exert himself. (Hear, hear.) I cannot but express an opinion, in conclusion, that both the Royal Agricultural Society and the Cirencester College are on the wane.

Mr. SMITH said: As a member of the Council of the Royal Agricultural Society of England, I should be wanting in my duty if I did not vindicate that extraordinary society, which has risen up to our rescue, from such an attack as has just been made upon it—an attack which I think wholly undeserved (Hear, hear). The subject of tenant-right is, I conceive, all-important in reference to labourers. It has been alleged that the tenant farmers of England are short of capital. I would ask whether, if you were to go to your banker and request him to lend you £500, he would not say, "Give me security; under whom do you hold? what is your tenure? and what is the security you have to offer" (Hear, hear)? If you want to stimulate and encourage the unfortunate labourers of this country, you cannot do so more effectually than by establishing tenant-right. The moment you improve the cultivation of the soil the labour market necessarily rises. We have all heard that the custom which prevails in North Lincolnshire is a healthy one, and that if we could see that established throughout the length and breadth of the land, we ought to be satisfied. But let me observe that there are many gradations from North to South Lincoln; and when you get into Rutlandshire you find that there there is no custom at all (Hear, hear). I contend that there should be one universal principle throughout the whole country. Mr. Bennett has related to you a conversation which he held with Lord Portman. I had a conversation with a landlord myself this morning, who said to me—"Some years back we heard nothing of tenant-right or the want of security of capital; all went on smoothly at that time." Why, gentlemen, in those days the state of things was altogether different (Hear, hear). We had not then any such thing as box-feeding, and various things tending to the improvement of land; and seeing that we increase the value of the fee simple, we have, I think, a right to ask for compensation (Hear, hear).

Mr. HARVEY said: As a member of a club in the county of Norfolk, by which this question has been entertained on two or three occasions, let me say that I agree most cordially in all that fell from Mr. Shaw in opening the discussion. It appears to me that we are pretty well agreed as to the impediments; but the question arises, What are to be the remedies? and that question again narrows itself into this—"Are the remedies to be of a legal nature or not?" In other words, Must we go to parliament? Now, this question of tenant-right is somewhat new; it is only recently that farmers have been awakened to a sense of its importance. And I must add to this, that I think we are attributing rather too much blame to landlords (Hear, hear). I don't find that tenant farmers who blame their landlords have in all cases been to those landlords to point out to them the impediments complained of. Estates have descended from father to son; and tenants are often willing to take them just as they were taken before without any express stipulation (Hear, hear). The chief point which requires attention is, I think, that connected with copyhold and holding for life; and I think what we are most called upon to do is to represent to parties who have influence in the legislature the propriety of permitting such parties to mortgage the improvements to their successors. If we pressed this point, and the point mentioned by Mr. Baker respecting fixtures, I think we should accomplish more than by introducing all the questions which can be brought forward.

MR. TURNER said—If I thought that by advocating tenant-right, I should be advocating anything which would benefit the tenant at the expense of the landlord, I should be the last man to open my mouth on the subject; but my belief is that the interests of landlords and tenants would be equally secured by the establishment of tenant-right, and that the community at large is also interested in the same direction. I would undertake to prove, by reference to past events, and by fair calculations of what is to come, that the landlord himself would be placed in a much better position at the end of a lease, by having an equitable tenant right, then he could be if the law remain as it now stands (Hear, hear). Laws are made, I presume, to protect the good against the bad; and though there

are thousands of landlords in this country who desire nothing but what is just and right, yet, as there are also unfortunately many who have no consideration for any one but themselves, it is necessary to establish by law some security for the capital invested. (Hear, hear). If tenant-right were established, one third more of the means of life would I believe, be produced in this country; and though a vast deal of extraneous matter has been introduced to-night, the good of the community is the real pivot upon which the question must hinge (cheers).

Mr. NESBIT.—Sir, I shall occupy your attention only a few moments while I advert to one topic which was introdueed by Mr. Shaw; I mean the topic of education (Hear, hear). When you look, gentlemen, at the state of the agriculturists generally, you find that there has been a progressive increase of agricultural education for a number of years; and at the present moment the agriculturists of this country are much better educated than they were at the period of your boyhood. The point which I now wish to impress upon you is, that if you obtain any assistance from science it can only be through experiments of science upon agriculture; and a more extensive education is required, in order that agriculturists may be able to make those experiments upon their farms which will be of such great use to them when they come to draw inferences from them. In all other departments we find that the education given is adapted to the business to be followed; but here we find that nearly all those studies of nature which would be so useful to the farmer are neglected, and instead of his having a competent knowledge of botany, chemistry, geology, and other sciences, through which he might be enabled to understand the nature of his soil and of the plants which he cultivates, his ignorance on such subjects is often unbounded (Hear, hear). The sciences of botany, geology, and chemistry ought to form part of every farmer's education; and were this the case, he would be able to learn from the facts brought before him, the only true system of farming (Hear, hear). The experiments of Mr. Lawes alluded to by Mr. Latimore are, I conceive, very beneficial with respect to the use of artificial manures. I think it right to state that I consider that all the manures that can be made by box-feeding and other means on the farm itself ought to be so made; it is only when a deficiency arises which cannot be thus supplied that artificial manures are required (Hear, hear). With respect to farmers' clubs, I think very great good would be done by securing an extended union of such clubs throughout the country. The dissemination of knowledge from this club to others is of very great service. It would be well, however, to have, as it were, a connected series; and I assure you there are many clubs which have great need of assistance to prevent them from ceasing to exist (Hear, hear).

Mr. WOOD said: I perfectly concur in many of the remarks which have fallen from Mr. Shaw, and other speakers, more especially in reference to copyholds and entails; but as to the idea of obtaining legislative enactments to interfere with and over-ride private bargains, I, for one, am decidedly opposed to it (Hear, hear). Our friend Mr. Shaw stated that we wanted leases, and security for the capital invested in the soil, and other things of a like nature; but he did not point out to us any means of obtaining such desirable objects. The real question is, who is to put the bell round the cat's neck? (A voice, "The farmers of England.") Mr. Bennett observed that there was in this country one most horrid race of landlords, whom he depicted by saying that their sole object was to get all the rent possible. Now I maintain, on the contrary, that the owner of land is entitled to do as he likes with it; that he is entitled to obtain the utmost amount of rent which can be obtained for it. If, indeed, he seek to enforce more rent than the farmer can pay, he will be damnifying himself, and will not, in reality, obtain so much rent as he otherwise would do. The notion which appears to prevail on this subject, is, I think, wholly fallacious. One gentleman said that the want of capital was the principal impediment to our advancement; when up rose Mr. Bennett, and said that that was a line of argument which he had not contemplated. I say that such an argument is quite within the question. The reason why many landlords do not erect a sufficient number of buildings is, that they have not a sufficient amount of capital to enable them to do so; and I maintain that, do what you will, secure what legislative enactments you may, you will not secure prosperity without some change in the money laws (Hear, hear). Let every man do as he likes with his own; but let the state take care that the laws are such that every man will be able to keep his own.

Mr. SHAW, in replying as the introducer of the subject, said—Gentlemen, it has been said, with great truth, that when people feel that they are not strong in argument, they have recourse to some other means of putting down their opponents. We have had some specimens of that kind of proceeding this evening; and I am sure that gentlemen who adopt that course would not feel offended if a similar course were pursued towards them (cheers). My friend Mr. Wood says, we see the effect, but don't know the causes. Now he will, perhaps, allow me to have an opinion as well as himself. I tell him that I think he sees the effects, but don't know the causes. Another gentleman, who takes views similar to those of Mr. Wood, has thrown out imputations upon those who differ from him, and under the circumstances I cannot help applying those inputations to myself. Now, although I should be the last man in the world to impute motives to others, I should also be the last man to permit any one to impute motives to me without resenting it (Hear, hear). Something has been said about the motives of parties in making attacks on landlords, and holding them up as perpetrating a system of cruelty towards their tenants. I, for one, disdain the imputation (Hear, hear), I have done no such thing. I have, indeed, cited cases of hardship which are known to have existed; but so far from having said anything prejudicial to landlords, I would refresh that gentleman's memory (and I believe he has been a member of the club some time) on this point, that, having first introduced the question of tenant-right, on behalf of the tenant, on finding it asserted that we were asking for something which was likely to be prejudicial to the landlord, I then took the other side of the question, for the purpose of showing that what we asked was not prejudicial to the landlord, and that we had, in fact, no such motive as was imputed to us. There were one or two other observations made on subjects not quite in point; but I will only say that, when I see gentlemen taking up such a high position on any particular matter of opinion, I am disposed to hark back, and to inquire whether there may not have been other occasions upon which such gentlemen have entertained other opinions (Cheers). I must confess that whether it be Sir Robert Peel, whose name has been introduced, or whether it be any man of less standing in society, if I find him for a series of years exercising his talents and abilities, spending his money, and urging others to do the same, in favour of one line of policy, and then, when it suits his convenience, turning round and becoming the advocate of another line of policy, I do not place much confidence in that man, be he who he may (cheers). With these remarks, I dispose of that part of the question. I will now just say a few words on one or two points which have been alluded to. With respect to the cur-

ry question. I will only observe, that so long as I can remember—and I am sure there are older men here who will give similar testimony—so long has the currency been with some people the millennium which we were led to expect, but unfortunately it has never arrived (Laughter). My friend Mr. Baker has corrected my interpretation of the word "villein." Now, I think I stated specifically that I did not consider the word "villein" analogous to the word "tenant-at-will." The reason why I did so was that I feared lest any person, looking at the peculiar position of tenants-at-will in these days, should receive the impression that formerly there was some connection between the two (laughter). Mr. Baker made one observation which, I confess, somewhat surprised me. He said that were he a landlord, having it in his power to assist in making the laws, he would, to the utmost extent of his power, maintain every privilege which he possessed through the possession of land; though, at the same time, he admitted that the demands of the tenantry are just. Now, I appeal to him to say what should be the course pursued towards a body of men who, knowing that, as regards the public at large, the demands made were just, yet, for the purpose of maintaining some ideal advantage, refused to concede those just demands? I omitted to make one remark, which is, I think, of great importance—that, after all the talk which there is of the want of education among tenants and labourers, education among landlords would do more good than almost anything else. In saying this, I am not actuated by the slightest feeling of disrespect towards landowners; but I place foremost in the list of "impediments" to agriculture the absence of knowledge on the part of our landed proprietors of the nature of landed property. Well knowing that the station in society of many of them is such as to require the devotion of a great portion of their time to the performance of public duties, I do not expect that they should occupy their time in managing their own property, but a general knowledge may easily be obtained sufficient to enable them to avoid important mistakes, and above all, that greatest of all mistakes, the placing the management of their property in the hands of persons whose pursuits in life not only have not enabled them to learn, but possibly may wholly have unfitted them for such a duty. Instances without end might be cited in which it would be much more advantageous to allow a handsome pension to the party to be provided for, rather than intrust him with the all-important duties of agent to an estate. Of all the positions in which a man can be placed, short of his being the owner, there is none which affords so noble an opportunity for the application of talent in executing an important trust to the solid advantage of the landlord, the prosperity of the tenant, and the comfort of the labourer, as that of an agent entrusted with the management of an extensive estate; and I do say that the amount of annoyance, loss, and misery occasioned by those who do not manage rightly, can scarcely be depicted in language. I now thank you for the attention which you have paid to my remarks; and let me observe, in conclusion, that notwithstanding all the misapprehension which exists in the minds of landlords and others on the subject of tenant-right, I feel perfectly convinced that the time is not far distant when justice will be obtained.

Mr. BELL claimed the right to defend himself against the observations of Mr. Shaw. For sixteen years he had been in the habit of expressing his opinion on the questions of free trade and the currency, and on those subjects his opinions had never changed.

Mr. TURNER proposed a vote of thanks to Mr. Shaw for the able manner in which he had brought forward the subject, which was seconded, and passed unanimously, and briefly acknowledged.

Mr. SHAW proposed a vote of thanks to the Chairman (W. F. Hobbs, Esq.) for his attention to the affairs of the Club during the past year, observing that that was the last evening on which he would preside.

Mr. LATTIMORE seconded the resolution, which was passed unanimously.

The CHAIRMAN briefly acknowledged the motion, and the company then dispersed.

It was the intention of Mr. Shaw to have submitted the following resolutions to the meeting, but was prevented through the confusion occasioned by a member—

That the natural and unavoidable effect of these and other such like "impediments to the development of British husbandry" are—

1st. To deter persons of capital and enterprise from engaging in farming, and thereby, now that the corn laws are repealed, to confer a decided advantage upon foreigners.

2nd. To enhance the price of agricultural produce, without corresponding benefit to the British farmer.

3rd. To encourage, on the continent of Europe and in the United States of America, every improvement in the production of food, to be put in competition with that of "native growth" in our own markets.

ANNUAL DINNER OF THE LONDON FARMERS' CLUB.

The annual dinner of the London Farmers' Club took place, at Radley's Hotel, Bridge Street, Blackfriars, on Thursday, Dec. 9.

The chair was taken about six o'clock by ROBERT BAKER, Esq., who was supported by—amongst many others, whose names we were unable to obtain — the following gentlemen: Mr. G. Turner, of Barton, Devon; Mr. Robert Smith, of Burley-on-the-Hill; Mr. H. Overman, of Weasenham, Norfolk; Mr. W. Shaw, of the Strand; Mr. J. Thomas, of Ludlington Park, Beds; Mr. G. Emery, of the Grange, Somerset; Rev. J. Y. Cooke, of Semer, Suffolk; Mr. J. Neame, of Selling-Court, Kent; Mr. J. Wood, of Hicksteed, Sussex; Mr. O. Wallis, of Overstone, Northampton; Mr. J. Beadel, of Chelmsford; Mr. W. Bennett, of Lewsey, Beds; Mr. W. Gray, of Courteen Hall, Northampton; Mr. W. Hutley, of Powers Hall, Essex; Mr. J. Hutley, of Rivenhall Hall, Essex; Mr. Cuthbert W. Johnson; Professor Way; Mr. E. Lewis, of Huntingfordbury Park, Herts; Mr. J. A. Ransome, of Ipswich; Mr. G. Josselyn, of Ipswich; Mr. J. G. Parson, of Haslemere, Surrey; Mr. J. Tyler, of Layton, Essex; Mr. E. Purser, of Bridge-street; Mr. F. Nesbit, of Kennington; Mr. Mechi, of Tiptree Hall, Essex; Mr. W. Cock, of Appledore, Kent; Mr. J. Flowerden, of Hinderclay, Suffolk; Mr. W. Verrall, of Manor House, Lewes; Mr. W. Eve, of North Ockendon; Mr. J. Bromley, of Derby; Mr. J. Lane, of Cirencester; Mr. G. Bodington, of Sutton Coldfield, Warwick; Mr. T. Owen, of Clapton, Berks; Mr. J. W. Granger, of Stretham, Ely; Mr. R. Cobb, of Town-place, Faversham; Mr. P. Martin, of

Eudsing, Kent; Mr. T. Knight, of Bobbing-court, Kent; Mr. J. Osborn, of Leighton Buzzard; Mr. J. B. Webster, of Hounsdown, Southampton; Mr. J. Webster, of Peakirk, Market Deeping; Mr. R. B. Harvey, of Pulham, Norfolk; Mr. J. J. Rowley, of Rawthorne, Mansfield; Mr. C. H. Lattimore, of Wheathampstead, Herts; Mr. J. Carter, of Boughton, Faversham; Mr. G. K. Cooper, of Euston, Thetford; Mr. H. Putland, of Hurst-green, Sussex; Mr. E. Lawford, of Leighton Buzzard; Mr. J. Barnard, of Olivesmere, Dunmow; Mr. J. B. Spearing, of Chilton, Wilts; Mr. W. Spearing, of Chilbolton; Mr. Walton, of Merdon, Winchester; Mr. C. Richards, of Tessoll, Birmingham; Mr. T. Elliott, of Scot's-float, Sussex; Mr. C. Lawrence, of Cirencester; Mr. Fordham, of Snelsnore Hill, Berks; Mr. F. Stunt, of Higham, Kent; Mr. J. Whaley, of Enfield; Mr. R. Nevins, of Mark-lane, &c., &c.

The cloth having been drawn, the toast of "The Queen" was received with customary enthusiasm. The healths of Prince Albert, the Queen Dowager, the Prince of Wales, and the other members of the Royal Family, were proposed and drunk simultaneously.

The CHAIRMAN then gave "The Army and Navy," to which he said the country was in a great degree indebted for its present security and prosperity. The toast was well received.

The CHAIRMAN then said he approached the next toast with something like a feeling of diffidence. He was utterly unable to express the high gratification which he felt in meeting so large, influential, and respectable a party as he saw before him on that occasion. The toast which he had to propose was "Success to the London Farmers' Club" (cheers). On the importance of that club it would not, at that moment, be proper for him to dilate at any length; but seeing that the objects of the club were beginning to be appreciated by those who were watching the events which were taking place in the agricultural world, it might be desirable for him to point out a little of its progress, and to show how it had advanced to the position which it then occupied. It was not a very long time—not more than about two centuries—since there was only one writer on agriculture in this country, only one by whom the science of agriculture had been reduced to a system. He alluded to Tusser, who wrote a short time before the year 1600, and who ushered, as it were, the science of agriculture into existence; followed, as he was, by other writers of eminence, until agriculture at last arrived at that degree of excellence which it had now attained (Hear, hear). It must be a source of pride to the farmers of the present day to see a science which was for so long a period little esteemed, now regarded as the grand support of the nation (Hear). With an extending and dependant population, with all the accessories of commerce and of improvement, it was necessary that this science should be advanced to the position which it had attained through the countenance of the sovereign, and the exertions of the farmers themselves in establishing local clubs. The London Farmers' Club was originated in order that it might form a point of centralization for the talent and information of farmers generally; that by its means they could exchange and diffuse their sentiments on various subjects of common interest. Looking upon agriculture as a science, its rapid and general advancement in the present day must be most gratifying to those who were assembled on that occasion. That this club would continue to advance, now that its benefits were so generally appreciated, he had no doubt whatever. If not light itself, most certainly the scintillation of light had been elicited by this club (Hear, hear). They were now proceeding in the right direction; endeavouring to place the tenantry of this country in their proper position, and to have the just claims of that body fairly acknowledged and equitably adjusted. He had been placed that day in one of the most gratifying positions he had ever occupied, having heard the Duke of Richmond, as the head of a society whose meeting he (Mr. Baker) was attending, aided by Lord Ingestre, and several other members of parliament, call upon the farmers to form a committee on the question of tenant-right, to consider the state of all the existing relations between landlord and tenant (cheers). He was quite sure that no announcement which it was possible for him to make could give greater satisfaction to the company assembled. He felt that it was with the Farmers' Club that that question had originated; and when he saw that, through the instrumentality of that club, the noblemen and gentlemen to whom he referred now appreciated its importance, and viewed it in much the same light as they did, he felt that they had indeed reason to congratulate themselves on the success of their efforts, and the future farmers of this kingdom would also have reason to rejoice that such an institution as the London Farmers' Club had been called into existence (Hear, hear). He would not trespass longer on the time of the company; he at once proposed, therefore, with heart-felt satisfaction, that they should drink "Success to the London Central Farmers' Club."

The toast was received most enthusiastically.

Mr. W. BENNETT being called on to respond to the toast, said—He must freely admit that he rose under no ordinary feelings of embarrassment; and well he might, when he found himself surrounded by a body of gentlemen, many of them not merely the first agriculturists of this kingdom, but also of the known world. In responding to the toast, it was his duty, as far as practicable, not to express his own sentiments merely, but, as far as he knew them, those of the London Farmers' Club, and also of the tenantry of the country. And he thought he should express their sentiments if he said that the tenantry, while they sought greater security for their property, had not the slightest wish to do that at the expense of the landlords of the country; and they who supposed that tenant-rights meant landlords' wrongs, grossly misrepresented our views (cheers). No, sir (continued Mr. Bennett), whatever may have been said of the farmers (and strange things have been said of late years), they were no Jacobins. There was no true or sensible farmer but that wished to see the landlords of the country in the enjoyment of their rents, and maintaining their high position in society; and he was free to admit that with all their faults (and where was the class without faults?), the land of no country was held by men of more honourable or live-and-let-live sentiments than the landlords of this country. He had come to that conclusion in the teeth of early prejudices. In early life he had read Cobbett's "Register," and almost swallowed his gridiron (a laugh); and although he was a clever man, and held very patriotic sentiments, he complained of the tenor of his writings as having a tendency to render a man dis-

satisfied with the entire state of society, inducing him to suppose that there was nothing but oppression and tyranny to be found in the higher circles, while virtue and integrity were to be found only upon the dunghill. Time, however, with some experience, had now greatly altered his views; and in his own opinion the marvel was that wealth, power, and influence did not make men more intolerant than we find them generally in this country (cheers). He trusted, however, these sentiments were not incompatible with a desire for the regeneration of all proved abuses; and he did not intend they should silence his tongue in denouncing what he believed to be wrong in society. And even admitting that legislators intended to do right, Time, that great innovater, was constantly casting up evils which required to be cured (Hear, hear). He considered the question of the law of landlord and tenant one of those evils. There was a time—and it had not long passed away—when the landlords required but little rent and the tenant made as little improvement. Mr. Bennett here went into the system of farming of the eighteenth and the commencement of the nineteenth centuries, observing that under such a state of things there required no tenant-right, the farm never was in debt, it owed no man anything, and the tenant might very well pack up his awls at pleasure (a laugh). But what do we now see? We see increasing millions of people looking on, and demanding to be employed and fed; and the laws of this Christian state provide that if not employed, they must be fed (Hear, hear). Many of you, continued Mr. B., have done your best to employ and feed them. You have in your respective districts given fertility to barrenness, and changed the face of the country; and you are saying, "Give us only that security for our property which all men more or less require, and we are ready to go further a-head;" and you would soon make this little sea-girt isle the garden of the world (cheers). But, on the other hand, what do we see? It cannot be denied that, while an increasing population everywhere presents itself, large districts of country are under the most wretched cultivation: if he inquired the cause of this state of things, it could not be denied that there was no general security, that he who made improvements would reap the benefit of those improvements (loud cries of "Hear, hear!") I admit, said Mr. Bennett, that a large portion of the tenants I have just spoken of are not enterprising, public-spirited men; and what right, he asked, had the public under that state of things to expect anything better at their hands, when in six short months they may be called to leave behind them whatever investments they had made? (cheers). Call it then what you will—call it tenant-right, justice to tenants, or by any other name you please, he cared nothing for the name—but most assuredly the people will never be secure of food, nor the great resources of the country brought out, until the tenant farmer is secured a claim for unexhausted improvements on being called to quit his occupation, by the same statute law of the land which makes him amenable for dilapidation and waste (loud cries of "Hear, hear"). There are many, however, who imagine that this object may be attained by mutual arrangement; and much as the towns' population (not understanding the matter) blame the farmers for hiring without leases and improvement clauses, the truth is, the competition for farms enables the landlord to please himself as to the terms of the hire in the majority of cases. And it is quite certain that without a parliamentary enactment it is only the better class landlords who would adopt it; while those who wish to keep in control the elective franchise, the liberty and the property of the tenant, will never adopt it. The opponents to any legislative enactment have conjured up a host of objections, but which, if you attempt to grapple with them, vanish into air. The common hackneyed objection that it would interfere with the rights of property, is grossly unfair; just as though the rights of property were only to be respected on one side. He contended that the present system involved a far greater infringement of the invested property of the tenant than any which they contemplated. But the truth was, the matter is called for as well on public grounds to provide food for the people, and prevent that drain of our gold which often paralyzes the whole community (cheers).

The CHAIRMAN said the next toast was one which he was sure would also be well received, viz., "Success to the Royal Agricultural Society." Placed at the head of the agricultural interest in one of the first (if not the first) agricultural kingdoms in the world, that society ought to be looked up to with no small degree of interest; and he was quite sure that, having regard to what it had effected in this land, they would all join him in drinking success to that institution.

The toast was warmly received.

Mr. TURNER said that, as a member of the Council of the Royal Agricultural Society, he thanked the company for the compliment which had been paid to that body, and the good wishes which had been expressed for its welfare. It was amongst the most grateful remembrances of his past life that he had been one of the first to join the ranks of that institution—an institution which he ventured to say had done more good in its time, and been of more essential service to the public, than almost any institution which had ever been formed; and his family would never have cause to regret the few guineas which he had expended in the support of an institution which was so efficiently advancing the cause of agriculture. He had always felt that every guinea which he might give, besides benefiting the country in general, would be made up to his children by hundreds, in consequence of the knowledge diffused by that society. It was delightful to meet in its circles men of all political opinions—Whigs and Tories, Conservatives and Radicals—all uniting in the advancement of the science and practice of agriculture, and endeavouring, if he might use the expression, to carry out the great Christian principle of providing more food, more raiment, more comfort, and more happiness for the great mass of society (cheers). When he saw the numerous offspring of that institution, and particularly when he observed so many local farmers' clubs, he could not but congratulate the company and himself on such results. There was special cause for gratitude to his friend Mr. Shaw, who in some respects might be regarded as the father of this institution. The only way in which they could repay the debt of gratitude incurred was by endeavouring to carry out the objects contemplated in the formation of the institution.

Mr. EMERY then proposed "Success to the Smithfield Club." In his own youth the members of such an institution were looked upon merely as persons who fatted animals to such an extent that they became a burden to themselves. He rejoiced that he had lived to see the day when the Smithfield Club was considered one of the most useful societies of which the country could boast. They had heard a great deal lately about "tenant's rights and landlord's wrongs." He had always felt the difficulty of going before the legislature to ask for an enactment which should meet the customs of

different counties, and he was still afraid that no law could embrace all the different cases that might arise (Hear, hear). He was glad, however, that men could be found to urge the question on the attention of the legislature, and had no doubt that ultimately much better relations would be established between landlord and tenant. He now scarcely read of a meeting of a society, or of agriculturists generally, at which the question of tenant-right was not brought forward in some shape or other, and he was gratified to find that in nine cases out of ten it was brought forward by landlords. When he heard Mr. Bennett say that there were three or four landlords present on that occasion, he began to feel that they were approaching the attainment of their object (Hear, hear). They might depend upon it that the more they got the landlord to associate with the tenant, the sooner would the object be secured. It was by that exclusive jealousy and foolish nonsense with which the two classes had often regarded each other that the evils complained of had been perpetuated, and so much discontent produced (Hear, hear). He thought he had lived long enough to justify him in repeating that they now appeared to be approaching the right point—a point at which the interests of landlord and tenant would be firmly knit together (cheers).

Mr. R. Smith, in acknowledging the toast, as senior steward of the Smithfield Club, took occasion to state that in future all restrictions connected with the Smithfield exhibition were to be removed. He observed that he was more and more impressed with the importance of the Smithfield Club. Upon the agriculturists of England rested the responsibility of providing the people with their bread-stuffs and meat, and he considered them as much manufacturers, in their own department, as the manufacturers of broad cloth, or any other article, were in theirs (Hear, hear). And if every thing were to be free which was intended for the manufacture of cloth, every thing ought to be free which was necessary for the manufacture of beef. They were often reminded that they were, as a class, much behind the cultivators of the soil in the sister kingdom. Now, he would ask if they were in an equally favourable position with the Scotch farmers (Hear, hear)? It had been his lot to receive a two days' visit from Mr. Douglas, one of the best farmers in the Lothians; and that gentleman told him that, with all the beauty and natural fertility of the soil which he (Mr. Smith) occupied, he would not take the farm, were it offered to him; that he would not have a farm which was let from year to year, or upon which he was not at liberty to plough up the grass lands (Hear, hear). It had been truly observed, in reference to leases, that they were not always applicable, because there was the well-known system of farming in and farming out. What they (the English tenantry) chiefly wanted was security for their capital invested in the soil, and that they might be paid for unexhausted improvements (Hear, hear). Having obtained that, they could cultivate the soil with benefit to themselves and to the country.

Mr. Shaw proposed the health of the Chairman, and said, there had been no little difficulty in thus far establishing the club, and it was only by the continued exertions of a few that its prosperity had been secured. Their worthy Chairman was one of the earliest members of the club, was among those who had been most regular in his attendance, both at the discussions and in committee; he had also been instrumental in inducing a vast number of persons to join the club, and had presided over those useful discussions which took place periodically, for the space of two years. He felt additional satisfaction in proposing the toast, because the Chairman had that day announced a fact of much importance to them as tenant farmers. He had told them that persons of high station, belonging to a society to which he was attached, were at last about to lend their influence for the attainment of the object dearest to tenant farmers. He (Mr. Shaw) confessed that he began to entertain some little hope when he saw a disposition to concession and justice manifested in such quarters. The Chairman had spoken of the progress made during the last two centuries, through the exertions in agriculture of tenant farmers; but though he had listened very attentively, he had not heard him speak of what the proprietors of the soil had done (a laugh). He hoped to have heard from him that they had co-operated for the same purpose (laughter). The time appeared to have at length arrived, however, when tenant farmers might fairly hope for the co-operation of landed proprietors. A gentleman, who noticed the presence of two or three landlords on this occasion, expressed regret that there should have been anything like a feeling of distance between the two classes, landlords and tenants, and breated a hope that they would in future meet together more frequently. If they could meet together on fair terms, there would be a prospect of success; but he would ask how it happened that this doctrine had been preached for one hundred and fifty years, and had been adopted and acted upon by almost every agricultural society, so that they had constantly met together at the same table, and yet that nothing had been done to secure that which was so essential for the tenant, viz., the protection of his capital? They had heard that evening of reforms in the Smithfield Club; but he had never heard, until such a dreadful outcry was raised in the sister country, of anything like a serious reform being attempted in the relations of landlord and tenant. Without desiring to trench, in the slightest degree, on the respect due to landlords, he went along with those who felt that, in the present state of the country, that respect should no longer be given for mere extent of acres or high position, but that it must be commanded by the performance of those duties between man and man, which alone entitled any one to respect (Hear, hear). He would be exceedingly glad to see landlords coming amongst them. He confessed that he would not have been glad to see that at first, as it was impossible at once to throw off that restraint which was induced by the presence of persons of elevated rank, especially when in the position of their landlords; but if the landlords came amongst them, now that they were an influential and united body, they would come admitting, in effect, the soundness and honesty of their principles; the very fact of their coming would amount to a declaration that they concurred in their sentiments. Above

all, it would be a great thing if the noble duke, who had been alluded to that evening (the Duke of Richmond), went into the question of tenant-right, with a full determination that the high character for honour which he had nobly won in defence of his country should be maintained pure and unsullied in dealing with it. (Hear, hear). By whomsoever the question may be dealt with or entertained there must be no evasion, no attempts at shirking the question; and whilst they respected the rights of landlords, landlords must, in return, respect theirs (cheers). Too many of them could cite instances of men being cut off in the prime of life. Such men frequently not only left behind them a family which had depended on their exertions, but also a large amount of capital buried in the soil; was it right that the widow and family, besides being turned adrift in six months, should remove nothing for capital actually expended? (Hear, hear.) Talk of "justice" and "the sacredness of private property;" why such an abomination as this existed in no other department of life in this country! (Hear, hear.) He felt satisfied that the question of tenant-right would soon be agitated from one end of the kingdom to the other; and if they did not succeed in persuading those with whom rested the power of legislating on the subject, such a moral influence would be produced that justice could not be refused. He concluded by again setting forth the benefits arising from the club, and expressing his opinion that it was destined to be the Runnymead of the tenant farmers.

The Chairman's health having been warmly received by the company,

The CHAIRMAN returned thanks. For the last 30 years of his life he had looked forward to the settlement of the question pending between landlord and tenant, with mixed feelings of hope and despair. He felt that under existing circumstances the tenantry of the country were in a position as helpless as that of any portion of Her Majesty's subjects: they had no voice in the legislature; and there were in that legislature numbers, whose interests were opposed to theirs; it was absolutely necessary, therefore, that this state of things should be rectified. It was absurd in itself that men possessing an amount of capital so large as did the tenantry of this country should have no legal security for its employment, and that when it passed from their hands into the soil, the landlords should receive all the benefit. Through the instrumentality of farmers' clubs, and especially of this club, they had brought mind to bear upon mind, in reference to this subject; and as the mind had always been the instrument of effecting great changes, so he trusted would the result be in the present instance. He would again assure them that his Grace the Duke of Richmond was determined to support the agriculturists of the kingdom, and that he would be assisted by other men distinguished for their abilities and influence in parliament. His Grace and his friends were ready to concede all that was right and just. (Hear.) He thanked them cordially for the compliment which they had been pleased to award him. He had never contemplated occupying such a proud position as that he now filled, representing as he did the tenant farmers of the country; and he should ever be sensible of the honour they had conferred upon him (cheers).

Mr. A. RANSOME said he was placed in a position of considerable difficulty. He had been requested to propose "Success to the Local Farmers' Clubs," and his difficulty lay in this—that as a member of a Society of Friends he was not accustomed to propose toasts. He felt, however, that there could be no impropriety in his proposing a sentiment, the tendency of which was to promote the good of all. (Hear, hear.) He therefore heartily proposed what he was sure would as heartily be received—"Success to Local Farmers' Clubs," wherever they might be established. He could not help remarking that he believed local farmers' clubs existed before the Central Club; and if, therefore, according to an opinion which had been expressed that evening, this club was the parent of local clubs, he could only say that "the son begot the sire" (laughter). He thought that it was incumbent upon all first to settle in their own minds the question whether farmers' clubs were useful; and being satisfied of their value, to do all in their power to support them. (Hear, hear.) It was all very well on an occasion like that, when the farming interest was concentrated in that city, to congratulate themselves on the existence of farmers' clubs; but there was a wide difference between the pleasant excitement of the moment and the constant, deliberate, steady, hard work, necessary to ensure success. (Hear, hear.) All, therefore, who desired to reciprocate the sentiment put into his mouth, should resolve that they would not be wanting in personal endeavours to ensure the object. He felt the great importance of their having the position they sought to obtain as farmers firmly established and recognised. There was great pith in the remark of his friend, Mr. Baker, that as the law rendered them unable to pay for dilapidations, it ought to provide security for that capital which was invested by the tenant in the soil, but which was now jeopardised in consequence of the existing state of things. It seemed to him (Mr. Ransome) that in order to the success of their object—and of its ultimate success he did not entertain the slightest doubt—it was necessary that the proper mode of advancing it should be deeply considered by them. The first great principle to be borne in mind was one which had been brought before the company that night—viz., that tenants' rights were on no account to be regarded as landlords' wrongs. Seeking only that which belonged to them, they must also seek it on right grounds and by right means; and they must not, under any circumstances, allow opposition, which was in many cases the result of ignorance, to excite in their minds any feeling but a desire to meet and combat it by argument; much less must they, in any instance, descend to invective. Whatever might be the immediate result of their endeavours, this at least was certain, that the moral force of strongly expressed opinions, if founded on right principles, could not ultimately do otherwise than prevail. While they recognised, in the fullest degree, the principle that property had its privileges, they felt also that it had its deep responsibilities; and if it had been declared with truth—if there were patriotism in the enunciation that England ought to con-

tribute as far as possible to the supply of her own commodities, that it was extremely desirable that England should produce what England had to consume, it was undeniable that those who occupied the land should be allowed the greatest amount of profit which it was possible, consistently with the interests of others, to obtain from the soil. He regretted that individuals were not always placed in positions in which they heard the truth. It was not only the landlords' interest, but he trusted it was also, generally speaking, his desire to promote the advantage of his tenants and of the community at large; and he must always remember that with the privileges which he possessed as a landowner, was combined the responsibility of endeavouring to make his land as useful as possible, both to those who held it and to society in general. Entertaining these views, he felt no doubt of the ultimate success of the Central Farmers' Club. He would repeat what he had already intimated, that it is highly desirable that in seeking to effect their object they would use courteous language; and he hoped that such of them as were members of local farmers' clubs would carry out these views, and in the spirit in which they were expressed.

Mr. Mechi rose to acknowledge the toast; and in doing so said, that he claimed to be considered essentially a practical agriculturist; following, as he did, the plough tail, residing on his farm, giving his own orders irrespective of a bailiff, and rendering himself responsible to his brother agriculturists for any defects which might exist. He was also a supporter of many local farmers' clubs, in different parts of the country, which he admitted were the parent of the central club in London. He recollected a period when the sentiments of many an honest farmer were locked up in his own breast, though they were ready to burst forth, and would have done so but for his fear of ruining himself and family. One of the great advantages resulting from the meetings of local farmers' clubs, was that here and there a bold spirit was found, bolder than his neighbours, to say that which was true, and to represent their feelings; and there could be no doubt that the more landlords became acquainted with those feelings, the more would their minds be disabused of the impression that farming was a mine of gold, and that farmers got nearly all the profits, and landlords hardly anything. (Hear, hear.) One object of farmers' clubs was to disseminate information and remove prejudices. Every time he met a Scotch farmer, he felt that one great source of their control over climate was to be found in a superior education, particularly amongst their labourers. In the better cultivated districts of Scotland you would rarely find a labourer who was not perfectly competent to read and write and to cast accounts. He felt strongly on the subject of tenant-right; the phrase was, in fact, a mistaken one: the question was not so much between landlords and tenants, as between the outgoing and the incoming tenant. There could be no doubt that however responsible the landlord might appear to be, it was the incoming tenant who would ultimately have to pay the outgoing tenant for the improvements of which he was about to derive the benefit; and he thought that through that not having been explained to landlords, much mistake and alarm had existed amongst them which might easily have been prevented, as if something were about to be taken from them to which they alone had any right. Having had an opportunity of mixing with a great many landlords as well as tenants, he had frequently found landlords taking land into their own occupation, in order to restore it to farm-like condition. (Hear, hear.) He said this advisedly: he was quite sure that whenever an act of parliament should be passed to grant compensation to tenants for improvements, there would be found a very large body of farmers in this kingdom, who would have no claim on account of improvements made under their management. (Hear, hear.) While he would be delighted to see those who did make improvements succeed in their present object, he also hoped to see a number of slovenly farmers turned out by means of the contemplated act, to make room for men of capital who would do better. (Hear, hear.) It was quite clear that farmers had much to effect in agriculture before they could arrive at anything like perfection; it was also clear that a vast amount of prejudice must be removed, that kind of prejudice which existed chiefly in the minds of those who farmed as did their grandfathers before them. (Hear, hear.) There could be no doubt that they would soon arrive, under the new act which he assumed to be passed (cheers)—with leases and compensations they would arrive at a better state of things. (Hear, hear.) They must have steam engines, for example, in every part of their farms. They were to be found in Scotland, and they must be used here, not because they were fashionable, but because they were profitable. There must be fixed steam engines for those who could afford them, and travelling ones for those who wanted their corn thrashed in different places; above all, they must look to education as one grand source of improvement, and as what would infallibly contribute to the benefit of landlord, tenant, and labourer.

Mr. J. C. Nesbit said that in rising to propose the toast which had been put into his hands, he must first of all make a few observations on one or two topics of considerable importance to tenant farmers. They had heard of poor farmers farming in modes completely different from those adopted by their friend Mr. Mechi, and no little blame had been cast upon those who continued such old-fashioned practices: he thought, however, that much might be said in defence of such persons: at all events they had not to bear the whole of the blame—a considerable portion of it would naturally fall upon the landlord, in consequence of the nature of the lease or agreement under which they farmed. It was quite impossible these men could be otherwise than slovenly farmers when they were liable to be turned off the property which they occupied, at the beck of the landlord; and on this account he thought that such universal condemnation was not their due. This was only one phase, however, of the interesting question which had been before the company for some time. It was necessary that the relations of landlord and tenant should be placed on a better footing, in order that better farming might be introduced. Many leases were at present so antiquated in their terms that they were wholly unjustifiable, and perfectly inconsistent with the comparatively enlightened views of the present day. The timber trees on many farms, especially in Sussex, in connexion with the smallness of the fields, could not but be a great impediment

to scientific farming. When they took into account the loss of manure, the robbing of the land of the light of the sun by means of the shade cast from extensive hedges, and other similar causes, they could not but compute that 10 or 15 per cent. less per annum was produced upon the farms in the county of Sussex than would otherwise be realized. Then, again, there was the question of out-buildings. They might laugh at poor farmers as they pleased—they might blame them to any extent if they wished to do so for allowing different kinds of manure to run into horse-ponds; but what could they expect when landlords would neither erect buildings themselves nor grant compensation if tenants erected them, and afterwards left the farm? No man could possibly be expected to lay out money in improvements unless he could rely on obtaining compensation. If, after tenant-right had been acquired, and all things had been placed on a proper basis of mutual benefit, if *then* the tenant farmer was not prepared to avail himself of the scientific information afforded to him, it would be his own fault that, in his case at least, British agriculture did not progress. He could not too much impress on the minds of gentlemen present that the power, the intelligence, and the advancement of the next generation of British tenant farmers must depend very much on the education which their sons now received. As farmers had to do with nature, peculiar facilities ought to be given to them for understanding her secrets; whereas, in fact, scarcely any attempts were made to give the sons of farmers a knowledge of chemistry, botany, or geology—sciences which entered so much into the distinctive features of farming. It was imperatively necessary that a better education should be given, in order that future farmers, if they could not subdue nature, might at all events be prevented from fighting against her laws. He concluded by proposing "The Committee," to whose excellent management, he observed, the club was so greatly indebted for the success which had attended it. The toast having been warmly responded to by the company,

Mr. Wood, as a member of the committee, briefly returned thanks.

Mr. Overman proposed the health of Mr. W. Shaw, jun., of Northampton, the Vice-president, who had done good service not only to the club but to the meeting of the Royal Agricultural Society at Northampton.

Mr. Shaw returned thanks.

Some other appropriate toasts were disposed of before the company separated, and the utmost good humour and harmony prevailed throughout the proceedings.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Monthly Council was held at the Society's house in Hanover Square, on Wednesday, the 1st of December. Present: His Grace the Duke of Richmond, K.G., in the chair; Lord Portman; Hon. Capt. Howard; Sir Robert Price, Bart., M.P.; Sir John V. B. Johnstone, Bart., M.P.; Mr. Raymond Barker; Mr. Branston, M.P.; Mr. Burke; Col. Challoner; Mr. Clifford Cherry; Mr. Childers, M.P.; Mr. Evelyn Denison, M.P.; Mr. Druce; Mr. Grantham; Mr. Hayter, M.P.; Mr. Hillyard; Mr. Fisher Hobbs; Mr. Law Hodges, M.P.; Mr. Wren Hoskyns; Mr. Hudson, of Castleacre; Mr. Jonas; Mr. Kinder; Mr. Marshall, M.P.; Prof. Sewell; Mr. Shaw, of London; Mr. Shelley; Mr. Slaney, M.P.; Mr. Thompson; and Prof. Way.

Finances.—Colonel Challoner reported, on the part of the Finance Committee, the examination of the accounts of the Society during the previous month; and, having stated that on the last day of November the invested capital of the Society stood at £8,999 stock, with a current cash balance in the hands of the bankers of £724, he proceeded to explain to the Council the proportions in which this balance was made up, of sums received on account of compositions for life, and arrears of subscription.

Lectures and Journal.—Mr. Pusey, M.P., Chairman of the Journal Committee, reported, as requested by the Council at their previous monthly meeting, the result of his enquiries on the subject of lectures to be delivered before the members on the occasion of their ensuing December meeting; and recommended that Professor Way, the Consulting Chemist to the Society, and Professor Simonds, Lecturer on Cattle Pathology in the Royal Veterinary College, should be requested to deliver lectures on their respective subjects, before the members of the Society, in the rooms of the Society, on the Wednesday and Thursday evenings, of next week, at such hour as the Council should decide upon as most convenient. The Council instructed the Secretary on the requisite communications to be made on this subject, and agreed to 8 o'clock in the evening as the hour at which the lectures should be given. Mr. Pusey further reported that a new number of the Society's Journal would be out in a few days.

Election of Council.—On the motion of Lord Portman, seconded by Mr. Shaw, the following resolution was carried unanimously:—"That each member of the Council be requested to nominate, in writing to the Secretary, such members of the Society as he would propose to supply any of the vacancies in the Council, on the Wednesday prior to the printing of the list annually laid before the Council: he having previously ascertained that such members would be willing to attend the Council. That the Secretary add to the usual form of list columns containing the names proposed, and stating by whom proposed; and also a column stating the number of Councils attended by each member who goes out by rotation and is eligible for re-election."

The following motion was also carried unanimously, on the motion of Mr. Hayter, M.P., seconded by Mr. Shelley:—"That the Secretary do notify to the Council any vacancy which shall be declared in the list of Trustees, Vice-Presidents, or Members of Council, at the Meeting of the Council next after the happening of such vacancy; and that such vacancy shall not be filled up until the Monthly Meeting of the Council which shall take place next after such notice."

Trials of Seeds and Gypsum.—Lord Portman favoured the Council with the following memorandum of results

obtained in the trial of seeds and gypsum presented to the Council :—*Sainfoin :* Failed to grow. *Cow-Parsnips :* Of no agricultural value. *Canadian gypsum ;* No result. Sufficiently marled. Mr. Hillyard's *turnip-seed* from Sweden : Turnips small, white, and soft."

Trial of Implements.—Lord Portman having presented a paper by Mr. Clyburn on implements exhibited at the country meetings of the Society, this document, along with the consulting-engineer's report on the mechanical conditions for the trial of implements, and all other papers on the same subject, were referred to the Implement Committee, to which the Council ordered the names of Lord Portman, Mr. Hudson, of Castle-acre, Mr. Druce, and Mr. Hayter, M.P., to be added, with a request that the Committee would report on the subject to the Council, at their monthly meeting in February next.

Appointment of Judges.—On the motion of Lord Portman, seconded by Mr. Shelley, the following resolution was carried unanimously :—"That any member of the Society who nominates a judge, be requested to certify that of his own personal knowledge he knows him to be qualified and willing to act as a judge for whatever classes he may be proposed to be appointed ; and who is unconnected with any exhibitor of stock or maker of implements, and has no direct personal interest in the stock exhibited as the breeder of any particular animals on which he might be called upon to adjudicate. That the list of names so proposed (stating by whom proposed) be as heretofore referred to the Committee of the Council, whereof the Stewards of the Yard of the year preceding be ex-officio members. That in case a sufficient number of competent persons is not proposed, the Committee are ordered to add the names of such other persons as they may know to be competent and willing to act."

Yorkshire Prizes.—On the motion of Mr. Raymond Barker, it was resolved—"That it be referred to the General York Committee to consider and report upon the appropriation of the £350 given by the Yorkshire Agricultural Society, at the ensuing Monthly Council in February."

Steward of Implement-yard.—Mr. Shelley gave notice, "That at the first Monthly Meeting in 1848, he should propose that Mr. Hayter be appointed Steward of the Implement-yard in the room of Mr. Miles, who retired by rotation." He also intimated his intention of moving a resolution for an increase in the number of Implement Judges, and the engagement of a mechanic to act with each division of such Judges, as proposed by Mr. Brandreth.

American Implements.—Mr. Slocum informed the Council that he had brought over to England, from the United States of America, a variety of simple and economical implements of his own invention, which were now undergoing a trial on the farm of Mr. Pell at Greenford, near Hanwell, on the Great Western Railway, to which he invited the attention of the Members of the Society.

Communications were received from the Board of Trade on the re-appearance of the Epizootic among the horned cattle of Wallachia ; from Mr. Moore, on the free tree transit of parties in charge of stock or implements ; and from Mr. Moyle on Canadian Gypsum.

The Duke of Richmond presented to the Society, for the use of the library, a copy of the Printed Report of the Select Committee of the House of Lords, of which His Grace was the Chairman, for inquiring into the expediency of charging Entailed Estates with the expenses attending their drainage and permanent improvement. —Mr. Franklin Knight transmitted from the United States a copy of his edition of "Washington's Agricultural Correspondence."—Mr. Clifford Cherry presented a copy of his work on "Queen's Plates, and the Breeding of Horses as Farming Stock ;" and Mr. Nicholls the last volume of the "Proceedings of the Poor-Law Commissioners ;" for which, and other presents, the thanks of the Council were ordered.

The Council then adjourned to their next Weekly Meeting.

A Weekly Council was held at the Society's House in Hanover Square on Wednesday the 8th of December, present, the Right Hon. Lord Portman, in the Chair, Lord Southampton, Mr. Almack, Mr. Thomas Raymond Barker, Mr. Geo. Raymond Barker, Mr. John Benett, M.P., Dr. Calvert, Col. Challoner, Mr. F. Cherry, Mr. Childers, M.P., Mr. Bell Crompton, Mr. Evelyn Denison, M.P., Mr. John Edwards, Mr. John Ellman, Mr. Hayter, M.P., Mr. Hudson (of Castle Acre), Mr. Hyett, Mr. Kinder, Mr. Scales, Prof. Sewell, Mr. Shaw (of London), Mr. Shaw, jun. (of Northampton), Mr. Slaney, M.P., Mr. Thompson, Mr. E. Tull, Mr. Geo. Turner, Mr. Tweed, Prof. Way, and Mr. Wingate.

Communications.—The following communcations were received :—Mr. Grieve, on the Cultivation of Rice. Mr. Jesty, on Manuring Chalk Lands. Mr. Marston and Mr. Taunton, on the Cultivation of Sainfoin. Mr. Bellamy, on the Cottage Farmer. Mr. Hincks, on the Produce of the Country. Mr. Grantham, Dr. Calvert, Mr. Drury, Mr. Aitkin, Mr. Whytell, and Mr. Newman, on Potato Cultivation. Messrs. Melton and Co. (through Prof. Way), a statement on the subject of Cotton-seed as Food for Cattle, with a specimen of the seed.

Two copies of the new Journal from Mr. Pusey, M.P., Chairman of the Journal Committee, were laid on the table for the inspection of the Council.

Notices of Motion.—Mr. Brandreth's notice of motion : "I hereby give notice, that at the next Monthly Meeting of the Council, I shall propose Colonel Challoner as a Steward of the Implement Yard, to fill the vacancy occasioned by the retirement of Mr. Miles ; and that I shall suggest the appointment of Sir Francis Lawley as a Steward of the Cattle Yard."

Mr. Shaw's notice of motion : "I beg to give notice, that I shall, at the next Monthly Meeting, propose Mr. W. Fisher Hobbs for election as one of the Stewards of the Implement Yard, in the place of Mr. Miles, who retires by rotation."

Mr. Slaney intimated his intention of again bringing

under the consideration of the Council the question of some improved mode of arrangement for discussion at their weekly meetings.

Special Councils were held on the following day, for the respective purposes of deciding on the prizes for stock at the York Meeting, and agreeing to a report to the General Meeting on the 11th of December: present, the Earl of Yarborough, President, in the Chair, Lord Portman, Lord Southampton, Mr. Raymond Barker, Mr. Bramston, M.P., Mr. Burke, Col. Challoner, Mr. F. Cherry, Mr. Childers, M.P., Mr. Bell Crompton, Mr. Druce, Mr. John Ellman, Mr. Jonas, Mr. Kinder, Mr. Shaw (of London), Mr. Shaw (of Northampton), Mr. Thompson, Mr. Geo. Turner, and Mr. Wingate.

The York prize-sheet for stock having been arranged, the two following instructions, proposed by Mr. Thompson and Lord Portman respectively, were ordered to be given to the general York Committee: viz., 1. "That the General York Committee be requested to consider whether any addition can be made with advantage to the prizes for cattle of the shorthorn breed, from the funds placed at the disposal of the Council by the Yorkshire Agricultural Society." 2. "That the General York Committee be also requested to consider whether any addition can be made with advantage to the prizes for horses, from the same funds."

The report to be made from the Council to the ensuing General Meeting of the Society was then taken into consideration and agreed to.

The half-yearly Audit of Accounts was held, agreeably with the terms of the bye-laws, on Friday, the 10th of December: present, Col. Challoner, Mr. Raymond Barker, and Mr. Blanshard, on the part of the Finance Committee; and Mr. Hampden Turner and Mr. Knight, as the Auditors on the part of the Society.

The Council stands adjourned, over the Christmas recess, to the first Wednesday in February.

A General Meeting of the Members of this Society was held at the Society's House, Hanover Square, on Saturday last, at 11 o'clock. The Earl of Yarborough, President of the Society, in the chair. Among the members present were His Grace the Duke of Richmond, Mr. Pusey, M.P., Col. Challoner, the Rev. Mr. Linton, Mr. Shaw, Mr. Hillyard, Mr. Raymond Barker, Mr. F. Hobbs, Mr. H. Gibbs, Mr. Westbury, Mr. Emery, Mr. Kinder, Professor Simonds, &c., &c., &c.

Mr. Hudson, the Secretary of the Society, read the following report from the Council:—

REPORT.

The Council have been actively engaged during the last half year, in carrying out, to the best of their ability, the various objects of the Society; either by a direct extension of their operations, or by such modifications of detail as experience may have led them to adopt: and in every change which they have effected for the promotion of these objects, they have, as in every former period of their proceedings, been most anxiously careful that no false step on their part should endanger the hitherto safe and steady progress of the Society in its career of usefulness, and the development of its powers for the common good of the country. They have the satisfaction of finding, that as the sphere of the Society's operations becomes enlarged, it maintains its progress in a uniform and steady course, but that while every advantage is taken of the light which science may throw on its path, they can securely rely on that beacon only for their guidance which practical experience has established. They trust that the motto of the Society, "Practice with Science," will continue, as it has hitherto done, to regulate its movements; and that science will be regarded simply as that knowledge of principles which is derived from observation or experiment, and that its deductions will be adopted only when the cases are similar in circumstance and condition:—that while theory suggests modes of improvements, practical experience will ever be held as the only safe test whereby to decide the question of their adoption.

The Council are enabled to lay before the Members a most favourable report of the state of the Society in each of its executive departments.

The Finance Committee will present to the meeting the balance-sheet of the general account as examined, and certified as correct by the Auditors of the Society. They will also submit the special balance-sheet of the Northampton Meeting, exhibiting a considerably diminished amount of charge against the funds of the Society as compared with previous years.

During the last half year 57 Members have died, 221 have, on various assigned reasons, ceased to be members, and 193 New Members have been elected. The Society accordingly now consists of—

93 Life Governors,
190 Annual Governors,
634 Life Members,
5369 Annual Members,
20 Honorary Members,

making a total of 6,306 Members.

The Chairman of the Journal Committee has submitted to the Council the new part of the Journal of the Society, which completes the volume for the year; and its immediate distribution will take place among the Members of the Society, under the usual regulations.

The Country Meeting at Northampton has proved one of the most successful of those hitherto held by the Society—in the number of implements exhibited, the quality of the stock, and the assemblage of visitors in the Show-yard. The Society before leaving Northampton passed unanimous votes of thanks to the Mayor and Corporation, and to the Local Committees and other official authorities acting under their instructions, for the manner in which they had so zealously and cordially co-operated with the Council in promoting the success of the Meeting; and the Council conveyed to Mr. Shaw, of Cotton End, their best acknowledgments of the essential services he had so kindly rendered to the Stewards of the Implement-yard in the discharge of their arduous duties.

The Council, in appointing the Judges of Stock for the Northampton Meeting, especially called their attention to those standing instructions of the Society which require the Judges of Neat Cattle, Sheep, and Pigs, in making their awards, to take into their consideration not

the market value to the butcher of the animals exhibited, but their qualities as breeding stock; and the Judges of Horses to take activity and strength into their consideration in addition to symmetry. The Council have also agreed to the following rules for the nomination of Judges: —"That any Member of the Society who nominates a Judge be requested to certify, that of his own personal knowledge he knows him to be qualified and willing to act as a Judge for whatever classes he may be proposed to be appointed, and who is unconnected with any exhibitor of stock or maker of implements, and has no direct personal interest in the stock exhibited as the breeder of any particular animals upon which he might be called upon to adjudicate. That the list of names so proposed (stating by whom proposed) be, as heretofore, referred to the Committee of the Council, whereof the Stewards of the Yard of the year preceding be *ex officio* Members. That in case a sufficient number of competent persons is not proposed, the Committee are ordered to add the names of such other persons as they may know to be competent and willing to act." It has also been arranged that in future one Steward of the Yard in each department will go out of office each year by rotation.

The Society was last year deeply indebted to the principal Railway Companies throughout the kingdom, who most handsomely conveyed, free of charge—both to and from the Show—all stock and implements entered for exhibition at Northampton; and their liberality was found so essentially to contribute to the success of the Meeting, that the Council addressed their thanks to the Directors of each of the Companies who had thus so highly favoured the Society. The Council, however, being sensible of the serious inconvenience which may possibly arise to the several Companies from the abuse of this privilege, have resolved, on their next application, to solicit, in the case of implements, a free passage only *to* the Show; while for the live stock intended for competition they intend to ask as before for a free transit in both directions.

In order to check the entry of stock or implements for the Country Meetings of the Society, and their specification in the printed catalogues, as well as the unnecessary expense of a preparation of space for their exhibition in the show-yard, when such stock and implements were either not intended at the time of entry to be sent to the show, or have been withheld upon insufficient grounds, the Council have resolved to inflict certain fines, according to the amount of head of stock or the value of the implements so entered; admitting, however, all just pleas in lieu of those fines, for all such accidental or unavoidable causes of omission, as the Council shall allow to be valid:—and for affording facilities to the implement-makers to complete the specification of their details for insertion in the catalogue, the Council have resolved to require only the entry of the particular implements to be exhibited, and the space they will require in the show-yard, as heretofore, by the 1st of May, allowing a further month, namely, to the 1st of June, for the completion of such specifications.

The Society have concluded with the authorities of the City of York an official agreement in reference to the Country Meeting of next year; and arrangements for the proceedings on the occasion have already been commenced. The Yorkshire Agricultural Society have liberally placed at the disposal of the Council the sum of £450 for the promotion of the objects of the Meeting; and the Council having already decided on offering a prize of £50 for the best Report of the Agriculture of the West Riding of Yorkshire, appropriated £100 out of this local fund for like Reports on the Agriculture of the other two Ridings. The remaining sum of £350 has been referred for appropriation to the General York Committee of the Society. This liberality on the part of the Yorkshire Agricultural Society, and that of the Lord Mayor and Corporation of the City, in a subscription of £1,000 towards the purposes of the Meeting, will enable the Council to make arrangements for the Meeting of 1848 on a scale of undiminished extent; and they have already decided on the Prizes to be offered out of the funds of the Society for stock and implements on that occasion.

The Council have unanimously appointed Professor Way, the author of papers in the Journal, on the Analysis of the Ashes of Plants, to be the Consulting Chemist of the Society, in the place of Dr. Lyon Playfair, whose increasing engagements prevent him from devoting to the office that amount of time and attention which he conceives its important duties to require. The Council have had the pleasing duty of conveying to Dr. Lyon Playfair their acknowledgments of the services he has rendered to the Society, and their satisfaction of finding from him, that, as one of their Honorary Members, he will still have it in his power to promote the objects of the Society, as occasions from time to time arise.

At the request of Professor Way, the Council have invited their Members to supply him with certain specimens of Grain, in order that he may obtain analyses of average specimens of particular districts, as well as of the whole country; an invitation to which the Members have most kindly attended.

The Council have to express to Professor Way, and to Professor Simonds, Lecturer on Cattle Pathology in the Royal Veterinary College, their best thanks for the Lectures they kindly consented at a short notice to deliver before the Members on the occasion of their present General Meeting.

In conclusion, the Council congratulate the Members on the great amount of good conferred by the Society, directly as well as indirectly, on the agriculture of the country, both in pointing out improved modes of culture and management, and in proving in many instances a safeguard against the delusion and error arising from untried theories or unsound practice. The first successful evidence of the value of the Society's operations has been to disseminate whatever has come under its notice as most valuable for adoption, rendering that knowledge of instances of good farming more general, which had so long been confined to particular local districts of the kingdom; and the Council entertain every well-grounded hope, that so long as the Society promotes as it does the united and friendly energies of the owners and

occupiers of land in the common cause of the improvement of the country, its operations will continue equally practical and important, and tend to the mutual interest of such parties themselves as well as to that of the community at large.

By order of the Council,

JAMES HUDSON,

London, Dec. 9, 1847. Secretary.

The Rev. Mr. LINTON said that he had great pleasure in rising to propose that the able report which had just been read by their worthy Secretary be received and adopted; and he could not but congratulate the Society on its extremely flourishing condition, as disclosed in the report. He thought the thanks of the Society were most eminently due to the Members of the Council and the other office-bearers of the Society, for their indefatigable exertions, to which the flourishing condition of their affairs was mainly to be attributed.

Mr. WESTBURY had much pleasure in seconding the motion.

The motion having been put from the Chair, was agreed to unanimously.

Mr. RAYMOND BARKER said that it was his duty to lay before the society a statement of their financial affairs for the last half year. Mr. Barker then read the following statements from the financial committee:

HALF-YEARLY ACCOUNT, ENDING JUNE 30, 1847.

Receipts.	£	s.	d.
Balance in the hands of the Bankers, 1st January, 1847	3356	0	8
Ditto Secretary, ditto	10	19	10
Dividends on Stock	129	7	4
Life Compositions of Governors	150	0	0
Ditto Members	232	0	0
Annual Subscriptions of Governors	713	10	0
Ditto Members	2590	9	9
Sale of Journal	195	10	6
Ditto Cottage Tracts	6	17	6
Receipts during the half-year, on account of the Country Meetings	42	10	0
Major Curteis's Prize for Essay on the Hop-fly	10	0	0
	£7437	5	8

Payments.	£	s.	d.
Purchase of Stock	1822	0	0
Permanent charges	270	12	6
Taxes and Rates	18	2	2
Establishment charges	543	12	9
Postage and Carriage	33	18	2
Advertisements	9	13	6
Expenses of Journal	1464	11	2
Printing of Cottage Tracts	10	12	0
Prizes	338	15	6
Payments during the half-year, on account of the Country Meetings	768	16	2
Analysis of the Ashes of Plants	209	15	6
Subscriptions repaid	15	0	0
Miscellaneous items	6	3	11
Balance in the hands of the Bankers, 30th June, 1847	1895	4	3
Ditto Secretary, ditto	30	8	1
	£7437	5	8

(Signed) THOS. RAYMOND BARKER, C. B. CHALLONER, HY. BLANSHARD, } Members of the Finance Committee.

Examined and audited this tenth day of December, 1847, and found correct.

(Signed) C. H. TURNER, THOS. KNIGHT. } Auditors on the part of the Society.

He had also to present to the meeting a statement of the account of the country meeting, held at Northampton in last July. It was as follows:

NORTHAMPTON MEETING ACCOUNT, JULY 1847.

Receipts.	£	s.	d.
Subscription from Northampton	1200	0	0
Sale of Pavilion Dinner Tickets	512	0	6
Show-Yard Receipts	2473	11	0
Sale of Catalogues	370	10	4
Sale of Council Badges	9	0	0
Excess of Expenditure over the Receipts on account of the Northampton Meeting, chargeable on the general fund of the Society	297	13	2
	£4862	15	0

Payments.	£	s.	d.
Pavilion Dinner	570	0	0
Pavilion Contract	640	0	0
Show-Yard and Trial of Implements	2522	14	2
London Police	153	11	0
Judges	274	0	0
Printing	360	7	7
Stationery	15	12	0
Advertisements	272	6	2
Postage, Carriage, and Travelling Expenses	25	6	1
Official Staff Charges	16	15	10
Porters in charge of Rooms	2	0	0
Council Badges	1	18	2
Agreements	3	11	8
Surveyor's Plan	3	3	0
Miscellaneous items	1	9	4
	£4862	15	0

(Signed)
THOS. RAYMOND BARKER
C. B. CHALLONER
HY. BLANSHARD } Members of the Finance Committee.

He had to congratulate the society on the success which attended their last meeting in the country; and it would be satisfactory to the meeting to know that the receipts on the last day of that meeting were the largest that they had ever received. If any gentleman wished to examine the accounts, which had been examined and signed as correct by the auditors, he could do so after the meeting.

Mr. EMERY said that he had much pleasure in proposing the thanks of the society to the financial committee and the auditors, for the satisfactory and accurate accounts which they had placed before them. While he was on his legs he could not help adverting to the business of the week, and the meetings which had taken place in the metropolis. He was connected with most of the agricultural societies of the metropolis, and he had never spent a week with greater pleasure, and in which he had received more information. He alluded more particularly to the meeting of the Farmers' Club, which had been formed but a few years ago, and from which the agricultural interest had derived the greatest possible benefit. He was happy to say that the Farmers' Club was now brought into such a position with the Royal Agricultural Society that their interests might be considered as identical, and that the support which the former received was daily increasing; and he was sure that it only required to be made still better known to the public to receive a yet larger increase of members. During the present year a hundred new members had been admitted, and he was glad to say that there were among them both landlords and tenants, members both

from Scotland and England; and he hoped they would soon number many Irishmen among its members likewise. The Farmers' Club had already done much good, and as its prosperity increased, its usefulness would be extended. He was happy to see that landlords and tenants were becoming, by means of this society and the Farmers' Club and similar societies, one united family. He begged leave to propose that the report be received, and that the thanks of the meeting be given to the financial committee and the auditors.

Mr. R. W. Baker seconded the motion, which was carried *nem. con.*

Col. Challoner, after bearing testimony to the zeal and ability with which the finance committee and the auditors discharged their arduous and onerous duties, begged to propose that the auditors should be reappointed.

Mr. Kinder had much pleasure in seconding the motion.

The motion having been put from the chair, was agreed to without a dissentient voice.

The Duke of Richmond said, he rose to move that the best thanks of the meeting be given to the two learned gentlemen who had favoured them with lectures on Tuesday and Wednesday last. They all felt obliged to men of ability and science, who, from their experience and knowledge, gave them information that might be useful to them. He was of opinion that what they wanted was science with practice; and he was sure that every gentleman who had attended the lectures on Tuesday and Wednesday must have been greatly instructed, although the learned lecturers were called upon to address them on a very short notice. He wished in par ticular to notice the last lecture on the diseases of cattle, which was one of the most instructive to which he had ever listened. He did not mean to say that the lectures of Professor Way were not of the greatest importance and benefit, but that of Professor Simonds was on a subject in which they were all most deeply interested, and what was of great consequence, the learned professor gave it in language which they could all understand. He hoped they would continue to have lectures on the subject of the diseases of cattle, because it was little understood, and was of the greatest importance to the country at large. It was a duty which they owed to themselves to elevate the station of the veterinary surgeons throughout the country. There were at present many of that class, of ability and education; but their attention was almost exclusively directed to the horse; and those who came from the country must know that their cattle were left to men who had no professional knowledge at all, and whose advice could not give satisfaction. It was therefore of the utmost importance that they should elevate the position of the veterinary surgeon, and encourage competent persons to establish themselves in every part of the country, and that the owner and occupier should countenance them and associate with them, and he believed the result would be found highly beneficial to agriculture. He thought they ought to proceed in the course which they had this week adopted; he thought they ought to give men of science like Professors Way and Simonds every encouragement to come before them, and give them the result of their knowledge and science; and he was certain they would never find the farmers of England ungrateful. He had great pleasure in proposing a vote of thanks to the two learned professors, for the lectures with which they had favoured them during the week.

Mr. C. Hillyard seconded the motion, which was carried unanimously.

Professor Sewell said he felt highly gratified with the eulogium which had been passed upon Professor Way and Professor Simmons, for the lectures they had delivered. He thought the society had now taken the right direction, and he hoped they would receive the support of the society in aid of the Veterinary College. There were many other things which they had to propose to the society besides that alluded to by the noble duke, and which would be found beneficial to this country, but more especially to Ireland, in which it appeared that although they had veterinary surgeons who paid attention to the horse, there was none who could give advice with respect to cattle. He had a plan to propose to them, which had received the sanction of Mr. Powell, of Derbyshire, and which he hoped they would support; but unless they obtained a committee of the society to consider the system, they could not hope to be able to carry into successful operation. Gentlemen did not, he thought, take a sufficient interest in the Veterinary College, without which its usefulness could not be extended. They had, however, taken the first step in the right direction, and he hoped they would follow it up. He hoped members of the society would visit the College, and judge for themselves. This had already been done by Colonel Challoner, Mr. Hill, Mr. Brown, and others, who appeared to be satisfied with what they observed, and expressed themselves highly satisfied with the education and the practice given in the hospital; and he hoped that their example would be followed, and that other members of the society would visit them. He regretted to say that the Cattle Infirmary had been strangled in the birth; but they hoped, notwithstanding, that the individual members of the society would send to the college specimens and subjects, living or dead. This had been done by the Duke of Rutland, the Earl of Stradbroke, and some others; and he hoped that from all parts of the country others would follow the example. They had, he repeated, taken the first step in the right direction; and he hoped they would continue to turn their attention to the subject. He begged leave to offer them his best thanks.

Mr. Shaw said, that seeing several representatives of the press present, he was anxious that no misrepresentation or misunderstanding should go forth to the public on this subject. Professor Sewell had observed that they had for the first time taken a step in the right direction on this subject; and he (Mr. Shaw) was desirous not to permit that observation to go abroad without explanation. He begged to say that that was not the first step taken in that direction by the society, for it should be remembered that for the last eight years they had voted a sum of £200 a-year to the Vete-

rinary College, for the purpose of investigating into the causes of disease in cattle, sheep, and pigs, in addition to those of horses. He would make no further comment on this subject; but he thought it right to say so much in explanation, lest an error should go abroad through the means of the press.

Mr. George Dyer said that he had listened to what the noble duke had said with respect to the diseases of cattle. He knew that there was great number of lambs and calves which died yearly, notwithstanding that medicine was administered; and therefore it struck him that that must arise from something in the pasture. A number of sheep also cast their lambs without being diseased; and he himself was disposed to think that this was occasioned by the red wort or poppy. Now it appeared to him that if some gentleman acquainted with botany were sent to different parts of the country to examine the pasture, it would be much better and more likely to produce benefit than anything that could be done by doctors. He thought they would do more good by preventing the evil than by curing it. He hoped, therefore, the attention of the Society would be directed to the subject, and that some experiments would be made.

Mr. Cherry said that too much was expected of the pupils who attended the Veterinary College, and that instead of expecting them to make themselves proficient in the two branches of the profession—namely, that relating to horses, and also that relating to cattle—it would be much better that the pupils should be allowed to make their election for the one or the other, and to graduate for the one which they preferred. He thought that by adopting that system, much good would result.

Mr. Pusey said that he believed the business of the day had now been concluded; and he rose with much pleasure to propose the thanks of the meeting to their noble chairman for his conduct in the chair. The noble lord was so well known in the agricultural world, that he (Mr. Pusey) need only mention his name, and the manner in which he managed his own princely property, to make the proposition agreeable to them.

Mr. Hillyard seconded the motion.

The Duke of Richmond having put the motion to the meeting, it was cordially agreed to.

The Earl of Yarborough said that he could assure them he felt much flattered by the vote of thanks which they had just passed to him. When he had been first requested to undertake the duties of filling the office of President of the society, he was unwilling to do so, as there were many other members of the society whose names were better known to the farmers of England; but it was pressed upon him, and although he felt reluctant at first, he hoped he had done his duty, and would continue to do so; and he hoped he would have the assistance and co-operation of the Council and the Members of the Society. When he became President, he found the Society in a flourishing condition, and he hoped he would leave it in the same position. In many districts of the country in which such societies were formed, it had been found that after the lapse of 5 or 6 years, they had been abandoned; but he was glad that that was not the case with this society, but on the contrary, it maintained its position, which was an acquiescence in its usefulness. He believed that farmers were anxious to improve their lands, and had confidence in their landlords; but they did not know how to commence to improve; but as the information conveyed in the Journal of the Society was becoming more generally known, farmers were availing themselves of that information. From some abuse which had taken place last year, implements would only be forwarded free to the show-yard this year, but stock would be sent and returned free. One instance of the prosperity of the society he would mention: several persons to whom he had spoken on the subject of the arrears of their subscription had received the communication in good humour, and were willing to pay their arrears, which, in the present times, showed that the society was highly thought of. They could not sufficiently express to Mr. Pusey their appreciation of the time and talents which that gentleman had devoted to the management of their Journal, and for which they all felt under such a deep obligation to him. He had only again to repeat his best thanks for the honour they had conferred on him.

The meeting then broke up.

NEW MEMBERS.

Atkinson, Charles, Broughton, Cartmell, Lanc.
Bankes, John Scott, Corfe Castle, Dorset'
Barratt, William, St. John's, Wakefield, Yorks.
Berridge, Mathew, Ingarsby, Leicester
Blood, J. Howell, Witham, Essex
Boxall, W. B., Stopham, Petworth, Sussex
Cartwright, Richard Aubrey, Edgcott, Banbury, Oxon
Chadwick, Elias, Pudleston Court, Leominster, Her.
Corsbie, John, Horringer, Bury-St.-Edmunds
Cox, E. W., Haddenham, Aylesbury, Bucks
Cox, William, Scotchgrove, Thame, Oxon
Devas, Thomas, Dulwich, Surrey
Eggar, Frederick, Whitehall-place, London
Ellis, William, Ashford, Chertsey, Surrey
Foster, John, The Scaws, Penrith, Cumberland
Gardener, William Nettleton, Wells, Norfolk
Hales, Baseley, Sale House, Blofield, Norwich
Hamerton, James Hellifield Park, Skipton, Yorks
Hardcastle, J. A., M.P., Coptfold Hall, Ingatestone, Essex
Herbert, John Maurice, Rocklands, Ross, Herefordshire
Howes, Ephraim, Holt House, Leziate, Lynn, Norfolk
Hughes, Thomas, Heythrop, Enstone, Oxon
Kinnaird, Lord, Rossie Priory, Inchture, Perthshire
Labrey, John, Yew Cottage, Huddersfield, Yorks.
MacEwen, James, Palmer's Town House, Naas, Ireland
Milford, Lord, Picton Castle, Haverfordwest, Pembrokesh.
Nalder, J. H., Alvescot, Lechlade, Glouc.
Phillimore, W. B., Newberries, St. Albans, Herts.
Rees, Barton Edmund, Carlisle
Reeve, Richard, Nassington, Wansford, Northamp.
Reynardson, Rev. John Birch, Holywell Hall, Stamford, Linc.
Rooke, William W., Woodside, Lymington, Hants.
Rose, James, Bampton, Oxon
Smith, James, Wainfleet, Linc.
Soulby, John Cooke, New Bolingbroke, Linc.
Soulsby, Christopher Percy, Malton, Yorks.
Stamford and Warrington, Earl of, Enville Hill, Stourbridge
Stamford, Frederick, Houghbridge Hall, Great Oakley, Essex
Stephens, Charles, Reading, Berks.
Taylor, Henry, Bampton, Oxon
Whitgreave, Geo. Thomas, Moseley Court, Wolverhampton
Whitehouse William, Exchange Buildings, Liverpool
Williams, Peter, Siamberwen, Anglesey
Wilson, John, The Howe, Kendal
Woodyear, Rev. Fountayne, Darrington, Pontefract, Yorks.
Wyatt, T. H., Heythrop, Enstone
Wynne, Brownlow Wynne, Garthewin, Abergele, Denbighshire.

SOCIETY FOR THE PROTECTION OF AGRICULTURE AND BRITISH INDUSTRY.

The annual meeting of this society took place on Thursday, December 9, at their rooms, 17, Old Bond-street.

The Duke of Richmond presided, and among those present we noticed Lord Ingestre, the Hon. Henry Wilson, Mr. Augustus Stafford, M.P., Mr. Newdegate, M.P., Mr. Cayley, M.P., the Rev. J. Linton, Huntingdonshire; Mr. Robert Baker, tenant-farmer; Mr. H. Byron (the secretary of the society), Messrs. Jonas, Warsop, Wood, Neal, Thomas, &c.

Mr. AUGUSTUS STAFFORD, the hon. secretary, read the report, of which the following is a copy:—

"In presenting their report to the fourth general meeting of the Society for the Protection of British Agriculture and Industry, your committee have to express regret rather than surprise that that report should be presented during a parliamentary session in December. The last session having commenced in January and ended late in July, February, 1848, was, under ordinary circumstances, the earliest period at which it might be expected her Majesty would have called this new parliament together. But although there is no doubt that had the unhappy disturbances in Ireland been the only cause for summoning it, the Lord Lieutenant might have exceeded his ordinary powers, as did the Lord Lieutenant in 1846, and then have obtained a Bill of Indemnity as before. Yet the state of trade and of commercial credit presented features of so formidable an appearance, that no government dare encounter the tremendous responsibility of acting unaided by the great council of the nation. Thus, though our existence as a society is only of a very few years' duration, we have lived long enough to see trade and commerce revive under a system of protection, and to behold a legislature, after having abandoned that system and adopted an antagonist one, summoned at an unusual and inconvenient time, in consequence of the difficulties in which trade and commerce are involved. Therefore, whether we contemplate the elastic energies of trade and commerce under a system of Protection, or whether we behold their depression under a system of Free Trade, we find nothing to make us question the soundness of the principle which has united us, or to doubt that, in still continuing to maintain it, we do good service to our fellow-countrymen.

"Referring to the publications which have issued from this society, and to the reports and addresses which may be considered still more strictly to have enunciated its opinions, we find nothing to regret, and nothing to recant; we have never been in favour of prohibition; we have never advocated excessive duties; in some cases, as in that of wool, we have acquiesced in the abolition of all duties whatever; but we have always protested against the maxim of buying in the cheapest and selling in the dearest market, adopted, without qualification or exception, as a dogma in political science. We have ever denied that the removal of every restriction, the unqualified encouragement of foreign imports and consumption of foreign produce at home, would be followed by an increased demand from abroad for the staple commodities which we produce; we have ever denied that such a system would be fair towards the producing classes; we have ever maintained their paramount claims to consideration; and we have ever said that the poor man would feel, soonest and heaviest, a system which interferes so cruelly with the only article he has to bring into the market, namely, his labour.

"While it is too soon to pronounce a final opinion on the success or failure of the NEW SYSTEM, it is our duty to record and comment on its results, from time to time, as occasion may arise. That we won our empire, and its power, and its riches, and its civilization, and its prosperity, under the old system, is matter not of opinion but of history; that we shall be able to preserve it thus powerful, thus rich, thus prosperous, under the NEW SYSTEM, is of course, as yet, matter of opinion only. Free import prophecies proclaim that we shall accomplish still greater things; but it must be remembered that this system of Free Imports now has its history, as well as the system of Protection, and that, therefore, we are in possession of data to test, in some degree, our future as to its amount of prosperity, and our Free-trade prophets as to the amount of credence due to them.

"And, first, as to foreigners; we have ever contended that, while it was quite competent to us to establish the NEW SYSTEM of Free Imports, and to demolish every Custom House in our Queen's dominions, yet that any system of complete Free Trade was far beyond our power, Free Trade requiring, as is obvious, the concurrence of foreign powers, which Free-traders prophecied, and we denied, would immediately be given so soon as we set the example. What is the result? Some duties in foreign ports have been lowered, some have been raised against us; but not one single power has recognised the NEW SYSTEM; not one nation has practically advanced towards it. We may well, therefore, ask our adversaries to tell us who have, as yet, the best claim to foresight in this instance? And whether, having thrown away our powers of concluding reciprocity treaties, we are not further than ever from the practical advantages of unfettered commerce.

"They told us that the trade in corn was a gambling trade, because of the sliding scale. The sliding scale has been abolished; and no one will deny that never, in the history of the corn trade, or of any other trade, has gambling been as excessive or speculation more ruinous. They told us that this sliding scale produced great variations in prices, but we find the extreme fluctuation between any two weeks in 1845, 4d.; in 1846, 5s. 2d.; in 1847, 22s. 1d.—four times as great in 1847 as compared with 1846, sixty times as compared with 1845; and, on comparing the average of the entire years, the result corresponds (loud cheers). The average fluctuation of any two consecutive weeks in 1846 was half-a-crown; in 1847, 8s.; while the extreme fluctuation in 1847, curiously enough, amounted to one shilling more than the whole price at which, under the old law, corn would have come in duty free, or at 74s.

"They told us that we need fear no drain of bullion for imported corn, inasmuch as we should pay for it by manufactures; but the gentlemen who waited on the Chancellor of the Exchequer, on the memorable 23rd of October, truly told him that within four and twenty hours they might find it necessary to ask from the Bank two milions on their deposits, and if they did so, the Bank would have stopped payment, or have violated its charter.

"They told us that exports would bear a nearer proportion to imports; but the increasing disproportion between the exports and imports since the adoption of free trade cannot be better illustrated than by the following figures; by which it will appear that the exports of the year ending January, 1846, are less than those of the year ending January, 1845, by £1,526,789, according to the declared value; whilst the imports have increased for the year ending January, 1846, by £9,840,403, according to the official value. But if we take a comparison of the manufactures exported in the first nine months of the three last years, so as to bring a comparison up to the latest period, we find that, for the nine months, that comparison stands as follows:—

1845.	1846.	1847.
£41,732,148	£40,008,874	£39,975,207

showing a falling off in the nine months ending October, 1847, as compared with the same period in 1845, of £1,756,941! but in the months ending October 10, in each of these three years—

1845.	1846.	1847.
£5,323,553	£5,477,389	£4,665,409

which shows a falling off in the month ending October 10, 1847,

of £658,144 as compared with 1845, and of £811,980 as compared with the same month last year.

"They told us that employment would be certain, especially in the manufacturing districts; yet we have found almost the whole autumn passed in negotiations for suspension of work, and for shortening the hours of labour in the manufacturing districts; and the prospects for the winter give little hope of better times.

"Whether they who have thus prophesied will be warned by these results it is not for us to say. Men who prophesied so arrogantly, who refused to admit any qualification, or to make any allowances, or to admit any elements of doubt or difficulty in their consideration of the NEW SYSTEM, may now remember how often we told them that the complexities of our social state could not be thus easily unravelled, or the destinies of our vast interests be thus certainly predicted; and they may be inclined to believe that those who counselled caution, and who dared, amid scornful opponents and triumphant majorities, to utter words of protest and of warning, may be entitled to some credit, or at all events to some attention, when they say that our colonial empire never can be maintained, if unprotected and unfavoured by the mother country, and that a revenue, whose last quarter's return represented it as failing at the rate of six millions a year, can never be restored by a compliance with free import theories, except through the imposition of intolerable taxes. This latter subject your committee recommend to the serious consideration of the society, feeling that, in the approaching session, it must become of primary importance.

"Your committee beg to recommend the formation of a committee on the subject of tenant-right. Mr. Pusey has given notice of a bill on this subject for England, and government intend to bring one in for Ireland; the principle of both bills must obviously be the same, though the details must probably be widely different. Your committee rejoice to see, in the growing interest on this subject, no alienation or hostile feeling whatever between the owners and occupiers of land; and if the committee on this subject be composed indifferently of owners and occupiers, nothing but good can result from their free communication of facts and opinions to each other.

"The suspension of the Corn Duties Act expires in March, and your committee are of opinion that it would be unwise at this period to suggest any course to be taken by the society with regard to it. The act never was accepted by the landed interest; but we felt it advisable to rest the whole responsibility of the measure with the government who introduced the NEW SYSTEM. The act was proclaimed as a master-stroke of political legislative wisdom; but the sound of the eulogies lavished on the bill still lingered in the air; the ink that traced that enactment was scarcely dry, when it disappeared at the first approach of the evil it was intended to subdue, and vanished before the calamity had reached half its height. It is rather—so far as it goes—a question of revenue than of protection; and, perhaps, it would be better to refer its consideration to a special meeting, to be hereafter convened by our president for that purpose.

"Since our formation some who co-operated with us have found reason to change their opinions, and to approve of the perilous emprise for which the fortunes of the country are now embarked. While we impugn not their motives, we again repeat that we are not without hope that those who have once changed may some of them change again, and may come back to us; may come back, not to the advocacy of any particular protective duty, but to the maintenance of an anti-free-trade system; and that we, meanwhile, see nothing in this difficult and gloomy period to make us abandon ancient principles, but many things to make us hope that, if England can bear the tremendous experiment she now has chosen to make, her disasters will one day have at least the good effect of recalling her to a system of legislation which has made her sons love the institutions of their country, and has extended her empire through the habitable world." "RICHMOND."

The conclusion of the report was followed by loud cheers.

Mr. ROBERT BAKER said he rose with great pleasure to move that the report—the very able report he would say, which had just been read by the hon. gentleman (combining as it did, with the various points on which it touched, so much of the sentiments of the members present at this meeting), be adopted and received. In doing so he must say he felt that a vast amount of benefit must result to this society, and the community generally, by its being widely diffused and published throughout the empire. This society has been established, as the title given to it clearly indicated, for the protection of agriculture and of British industry; and it was now evident that the purposes for which it was established had shown it had not been founded in vain. And now that the experiments of the free traders had been found practically to be so utterly deficient in their effects, this society had a right to fill the triumphant position which it now occupied—exerting itself as it still was to restore a wholesome state of things to the country. He would not trouble the meeting at any length, because he felt there were many present who had a variety of engagements (Hear, hear); but he could not allow the opportunity to pass without congratulating the meeting on the benefits which it had already conferred on the agricultural interest. But he rejoiced not only on the good which the society had already done, but at the power the elements of which it contained within itself to bring back that fair and justly remunerating system which the agriculturists had a right to demand (Hear). They would not let the foreigner step in, backed with all the advantages of procuring labour at a much cheaper rate, of obtaining materials and manufactures at a less amount of charge. On account of the difference of the currency which exists in different countries the foreigner possessed paramount advantages, and could obtain a fair profit from his transactions. But the position which he (Mr. Baker) started with was this, that with an immense pressure of taxation—with a metallic currency under which our monetary system was governed, and with other difficulties which operated prejudicially to the British agriculturist, it was impossible that they could contest or compete with the foreigner on free-trade principles (Hear, hear). For himself he had always entertained that opinion, and he was still of the same opinion, and therefore it was that he had great pleasure in moving that the able report which had been read should be adopted (cheers).

Viscount INGESTRE, M.P., rose to second the motion that this report be adopted. He had little anticipated, at the time of the formation of this society, that he should so soon be called upon to bear witness to the results of the adoption of principles of free trade. When this society was first formed it was formed with a view to create, as it were, a rallying point for the good sense of the country; and he repeated that he had little anticipated that they would have had such results brought home to them in so short a space of time. It was only in the session of 1846 that the total repeal of the corn laws was carried by both houses of parliament; and now, at the latter period of the year 1847 only—a little better than eighteen months after the measure for the abolition of the corn laws was carried, the country was in a condition of unexampled gloom and disaster. He trusted that when the predictions which they (the protectionists) had ventured to put forth at the period he alluded to had been so disastrously realized, they might yet contemplate the support, not only of the agricultural but of the manufacturing interest also, who had, beyond doubt, suffered more intensely than the agricultural interest. The Protectionists had told the manufacturers that they would be the first class to suffer—they had predicted that the same blow which was levelled against the agricultural body would reverberate with double force on the manufacturing interest. The free traders had told the country that when the corn laws were abolished this country was to be the workshop

of the world. The report which had been read told them that there was not a single nation which had aided this kingdom in a return to a state of commercial prosperity. He trusted that when that able report should go forth to the world, it would be studied calmly and deliberately, and that we might yet hope to stop ourselves in our downward career of evil before it was too late. It would be for the legislature to consider how far this was to be accomplished; whether it was to be done by an alteration in the circulating medium of this country, or by the re-enactment of protective laws. He would conclude by warmly seconding the motion, that this report be received.

Mr. JONAS, sen., said he quite agreed in all that was stated in the report; and he begged to thank the committee who had prepared it for the able manner in which they had executed their task. He held in his hand a calculation of the value of the imports into this country in the nine months ending 10th October, 1845, as compared with the amount for the same nine months ending 10th October, 1847. The articles enumerated in the calculation included cattle, calicoes, sheep, lambs, hogs, bacon, beef, butter, cheese, wheat, barley, oats, rye, maize, flour, barleymeal, oatmeal, ryemeal, Indian corn, hams, pork, and rice. The value of these imports for the nine months ending 10th October, 1845, was £4,410,091; for the same period in 1847 it was £31,241,766. Mr. Jonas then read the following statement in continuation:—I have not varied the price for live cattle and dead meat, butter, or cheese, as the average price of these articles for both years was so nearly alike; and by this statement it appears that the money required to pay for these articles of imports in nine months, ending October 10th, 1845, was only £4,410,091, but that in the same period of time ending October 10th, 1847, the money value of the same articles imported was £31,241,769. We thus prove that £26,831,678 more money was required to be sent out of this country to foreigners, to pay for these articles; and I find that the declared value of British and Irish produce and manufactures exported in nine months, ending October 10th, was as follows:—

1845	£41,732,148
1846	40,008,874
1847	39,975,207

So that we find that under free trade we have diminished exports in nine months in 1847, as compared with the same period for 1845, of £1,766,941; and, therefore, the balance of trade has been against this country to an extent of £28,598,619. I am foolish enough to imagine that twenty-eight and a half millions of cash being sent abroad to balance this account have caused the derangement in our money matters, and that we must not attribute it to the expenditure of our capital in the payment of labour, &c., for the formation of our railroads. If all that excess of money be sent out of the country, that, he thought, would satisfy the strongest advocate for free trade.

The question was put, and the adoption of the report was carried unanimously.

TENANT-RIGHT.

The noble CHAIRMAN then rose and said: Gentlemen, I merely rise to propose to you to appoint a sub-committee to carry out that part of the report in which it is stated that it is desirable that a committee should be appointed, consisting of owners and occupiers, to communicate together and give their opinion as to that question which is called "tenant-right." Now, gentlemen, I have always thought, and expressed it in public too, that those who wish to do justice to the tenant and landlord could not have selected a worse name than tenant-right (Hear, hear). I stated that in the presence of large bodies of tenant-farmers in the country, and they generally agreed with me, that the appellation is an injudicious one. Yet still, if I understand what is meant by tenant-right, I am one of its warmest advocates. I do not think the tenant has a right to come and force me to let a farm of mine to him, and that he is the only one to make the conditions, while I am to say nothing about the matter. I do dot think that would be just (Hear, hear). I think the great body of the tenantry have intelligence sufficient to make a good and fair bargain with their landlord; but I cannot disguise from myself that a great deal of the occupancy in this country is not derived directly from a communication between landlord and tenant. Many of the estates in this country are in trust for various reasons. Many of them—too many of them—are in the hands of solicitors. I do not mean to attack the profession of a solicitor, knowing as I do many most respectable men of that profession in the country; but I do not think that, in general, a solicitor will be found to have a sufficient knowledge of farming to make the best agent of a property (Hear, hear). There is a large portion of land in this country held under trust by corporations and municipal bodies. There are a great variety of holdings of that sort. Many of these, as you know, are held under yearly tenancy. I have always advocated leases, and shall continue to do so, but I never will force a tenant of mine to take a lease from me, for many of them, and their ancestors for many years, have occupied those farms without leases, and they wish to go on as they have done. I will not remove them from their farms because they may not wish to enter into a lease. And here I must say, it is extraordinary that many of the advocates of leases only commenced their demand for them when it was impossible to say what would be the price of corn three years afterwards. I always advocated leases. Why? Because a prudent tenant will not lay out large sums of money on the improvement of his land if he has only a yearly tenancy. He will not do so, because he does not know to what extent the ruinous measures of cold-blooded political economists may go, aided by such treachery as was exhibited in Parliament during the last session. (Hear, hear.) But we come now to the question of tenant-right. I think it would be an advisable thing for the country that Parliament should appoint a committee to inquire into the various customs that exist in different parts of the country, and to examine practical farmers upon the subject; because it is clear that the farmers expend more capital now than they did thirty or forty years ago, in the purchase of oil cake, for instance, and in other improvements. I say that the custom of the country requires amendment; and I should go into such a committee, if I were a member of it, with a desire to do my duty, not to the landlord or the tenant exclusively, but to do my duty to both; for I hold it is impossible to sever the connection between landlord and tenant without causing much mischief to the country at large. I feel that, as a landlord, it is my pride to meet my tenantry whenever I have an opportunity to do so, in the market, and to find that they have made such a bargain with me as will be advantageous for both parties. But I think that the tenantry are entitled to demand the establishment of that custom of the country which would permit a tenant, when he is dispossessed, either through the fault of the landlord, or from having affronted his agent—which did, as a general rule of the land, permit such a tenant to claim compensation for whatever unexhausted improvements he may have made. I know that that part of the measure, when it was proposed by Mr. Pusey, was objected to by some of the landlords; but I think it is because they have not fully considered the question. What I mean is this: if my friend Mr. Jonas were to build a good stable—if he built it upon wheels he would be entitled to remove it; because, then it is not part or parcel of the freehold; but if—what would be much better for the landlord—he

were to build it with a wall, then, even though he might have built it for one year, and he had derived no advantage from it, still it would become the property of the landlord, and the tenant would not be entitled to remove it. Not that I think the tenant has a right to build whatever he likes upon the land, and then to force the landlord to purchase it; but he ought to be free to sell it, if he can, to the next incoming tenant, or if he cannot do that, to remove it altogether; at the same time that he certainly ought to be bound to leave the site in the same position as he found it before the erection. I may state further, that I intended, during the last session, to have moved for a committee upon this subject in the House of Lords; but when I found that Mr. Pusey had given notice of his bill, I felt that I ought not to move in the matter, but to leave it in the hands of Mr. Pusey. However, as Mr. Pusey did not succeed in carrying his bill through the House of Commons, I feel that he can have no right to complain if any member of the two Houses should bring forward a motion for a committee, so that we really may get some information from various parts of the country, and do something which may be advantageous to the agricultural interest at large. Because, depend upon it, though the landlords may, for the most part, be both able and willing to improve their property, yet there are many of them who are very unable to do so; and they must look to tenants who have large capital to assist them; and if the tenantry have not leases, I think they ought to be protected in their unexhausted improvements, so that there should not all go into the pockets of the landlords. I think we should therefore appoint a small sub-committee, whose duties would become very important if Parliament were to allow the committee to be appointed at which I have hinted, as in this way we might be able to get the feelings of the respective tenantry of the different districts; because I need not tell you that the custom varies, and ought to vary, between Sussex and York, and between Cambridge and Lincoln; but, at all events, we might present such a report to our members as might lead to some useful measure being adopted. I have taken the liberty to throw out these hints, and I hope some of you will move that such a committee as I have alluded to should be adopted. (Hear, hear.)

The Hon. Mr. WILSON said he did not mean to detain the meeting long, but he could not resist expressing the gratification he felt in having heard these observations from the Noble Duke. He also regretted that the words "tenant-right" had been adopted; but he had for a number of years used his utmost endeavours to promote a mutual and a well-placed confidence between landlord and tenant, and he was happy to state that he had succeeded to a great extent in the plan which he had adopted. His plan was in arranging with his tenants to put a clause into the agreement, which he had adopted ever since 1800—providing that the tenant should be repaid for all the unexhausted improvements which he might have made over and above those to which the landlord had contributed. (Hear, hear.) In this way he had the satisfaction of seeing the son follow the father, from generation to generation, on the property with which he was connected; and there was no lease—there was not a single tenant on that property who would take a lease; and he never yet, in all the various agreements he had made, found a tenant who was not satisfied with such a clause. There were some tenants in the years 1835 and 1836, when there were great changes in the price of corn—there were some, not of his, but of other tenantry, who did not pay the expense of a lease—who would not pay even for the stamp on which it was written—they would much rather be without it; but all were satisfied that this clause was better than a lease, which allowed them to be paid for those unexhausted improvements to which the landlords had not contributed, and which were to be valued by mutual arbiters. (Hear, hear.)

Mr. NEWDEGATE rejoiced in the prospect there was of this society appointing a committee to consider the relations that existed between landlord and tenant, and to inquire into the various customs of the country which prevailed in certain districts. At the same time, he was confident the Noble Duke spoke a great truth when he said that the changes anticipated in the value of agricultural produce and property, by the recent alterations in our commercial policy, entailed an alteration, at least, if not a severance, of the relations which now so happily subsisted between landlord and tenant. His own view decidedly was that, by legislation, they should do as little as possible, so as not to interfere with the good understanding which at present existed between them, and that the best means of doing that was to bear in mind the maxim of the political economists, that every man should be free to dispose of his own property, and to direct his own industry; and for this purpose it was necessary they should recommend to the committee that they would suggest that the provisions of the law to be enacted should only step in when mutual provisions failed (Hear, hear). Such was the view which this society had deliberately taken of tenant-right, as it was unfortunately called; and he begged to remind the meeting that the society had not been idle on this subject, but that the general committee had, on the 8th of June last, moved a resolution to this effect:—"That the society will promote, to the utmost of its power, a full inquiry by the Legislature into the mutual interests and relations of landlords and tenant-farmers, with a view to the introduction of some measure for the regulation and equitable adjustment of the same." The question then might be asked, why had they not moved in the matter already? The answer to that was, that as the Parliament had been summoned for the special object of considering the commercial distress that had occurred through the operation of Free Trade, acting upon a restricted currency—(Hear, hear)—we were unwilling to divert the attention of Parliament to such a grave subject as this, as it would only cause embarrassment, and prevent the due consideration of that subject for which Parliament had been summoned. But at the last meeting of the committee the suggestion of the noble duke was acted on, and the following resolution was passed:—"That a committee of this society be appointed to consider what steps shall be taken to carry out the resolution passed on the 8th of June, 1847, with respect to the relations of landlords and tenants, the members of the committee to be nominated at the next meeting of the general committee." He hoped that this general meeting would now sanction the step which the committee had taken. He did not wish to go into any of the subjects that were set forth in the report, but he could not help urging upon the members of this society, and upon the adhering societies, and their constituent members throughout the kingdom, that if ever there was an instance of the fallacy of predictions, they had one in the very outset of free trade. He thought the advocates of these measures for very shame would not look back upon these predictions. Even the noble lord at the head of the Government admitted the other night that Parliament dealt in exaggeration—that it would not do to test the anticipations of an advocate too closely by the results of measures which he had urged forward. But he (Mr. Newdegate) would ask, if all the statements of an advocate were to be taken *cum grano salis*, why had parliament acted upon the extreme views upon the exaggerated statements put forth by the sanguine advocates of these measures? Had they not, at least, a fair ground to ask the legislature as it confessed the promoters of Free Trade dealt in exaggerations, why did parliament act upon their extreme views? Hitherto the Protectionists had occupied

a difficult position—that of defence. The Free-traders would now find a change of circumstances. Assault was always easy, as the assailants would always choose their ground of attack. Defence was another matter. All human measures were imperfect, and therefore there was always a difficulty in defending them. But he was much mistaken if the Free-traders, now they were put on their defence, would not find their position much less tenable than the Protectionists, for the system of Protection was at least a system of moderation (cheers). He was afraid he was going beyond due limits, but he was anxious to bring the meeting to right views on the subject of the relations between landlord and tenant, with a view to enact such measures as would confirm the good feeling that now existed between them, and that would in no wise encroach upon the rights either of one party or another.

Mr. ROBERT BAKER said, that as the originator of the resolution which had been read, he begged to say that he felt great pleasure in believing that the desired committee would be appointed to carry out the objects which they all had in view. As a tenant-farmer, he rejoiced in the opportunity that day afforded him of meeting such distinguished noblemen and landowners of the country, to put them in possession of what it was the tenant-farmers sought. He had lamented, and he still lamented, that the designation of "tenant-right" should have been adopted, because it seemed to destroy the principle which the tenant-farmers wished to confine themselves to. They had no intention to disturb the operation of any agreements between parties as regarded the cultivation of the soil; because if they had contemplated any such views it would have been an interference with the just and equitable exercise over property that men had. Every man had a right to dispose of his property as he chose, and that principle no legislation could disturb. But in the absence of an agreement, it was necessary that some law should be enacted for the sake of all parties: and there were three points to which he would beg to call attention. The first was as to the notice given to the tenant. At present that notice was applicable to six months. Now, he had always felt that that notice was too limited. It was hard on the tenant to quit at the expiration of six months, without having a sufficient time given him for procuring another occupancy which might suit him; and this short notice sometimes drove him to the necessity of disposing of his farming stock; whereas, if he had been allowed to stop, his position would have been very different. He therefore held that less than twelve months' notice ought never to be given to the tenant. The second point was as to the removal of buildings and fixtures. From his infancy he had always been at a loss to account for the anomaly that whereas a tradesman had the power to remove buildings, the farmer was prevented. It seemed to him to be a monstrous insult to reason, that because a building was cemented or was connected with the freehold it should not be moved, but that if it was built on blocks or placed upon wheels it might be taken away. Surely, if the landlords were unable to improve premises, it was only fair and right that the tenant should be allowed to do so, and that he should have the power to remove such buildings or be paid for them. These were the main points which occurred to him in respect to tenant-right. As regarded the third point, namely, the remuneration to be made to the tenant for unexhausted improvements, some alteration he felt was imperative. There was to be considered the outlay for improvement of the soil for the purpose of raising the grain which was necessary. It was impossible, under existing circumstances, that in one, in two, or in three years they could extract that capital or improvement which the tenant invested in it, unless he were protected by law. These, then, were the three main points which would have to come under the attention of the legislature, and the tenants had never contemplated any right beyond the equitable right to have protection for the capital which was invested in the soil. He stood forward to deny that which he knew was an unfounded impression which had arisen from the words "tenant-right." These words had been viewed in the same character as those which were applied to Ireland; they had not the same import in England, but persons confounded the one with the other. Their (the tenant-farmers of England) position was different from that of Irish tenants: they did not assume the right to an inheritance in the soil, which was assumed by Irish tenants. The English tenants assumed the right to participate in the capital which they employed, but to submit to the right of the landlord of calling upon the tenants, if they did any injury, to be liable for such damage. It was exactly in the spirit of the proposition which had been read by Mr. Newdegate that he only asked for an equitable arrangement, so as to enable the tenant to get a larger return for his capital. He concluded by moving, "That a committee be appointed in accordance with the resolution which had been read to consider what steps should be taken in pursuance of the resolution of 8th June, 1847, with respect to the relations of landlord and tenant."

The Duke of RICHMOND here rose and stated that he had to attend the committee of the House of Lords on the currency, and in apologising for leaving the chair, said if he were required on any light matter he would not leave; but, as the fact was otherwise, and the committee met at three o'clock, he must retire.

On the motion of Viscount Ingestre, thanks were voted to the Duke of Richmond, who returned thanks, and Viscount Ingestre was then called to the chair.

Mr. CAYLEY said it was not his intention to have offered any observations, but he would only say that, on the subject of tenant-right, he should be very glad if any good could be done, and he thought the tenant had a right to have his interests protected. As far as his experience had gone, he had not found that tenants were willing to accept leases. This might be from the fluctuation of prices, arising, as he believed, from the operation of our currency measures, which had caused such a depreciation between the years 1826 and 1835. It was in consequence of these fluctuations that tenants were unwilling to take leases. He knew that before that time, having an estate at a long distance, about 200 miles, from where he lived, he sent to three tenants from Yorkshire, and offered them leases. They told him (Mr. Cayley) that they would much rather trust him than take a lease; that the lease might not be as good as it appeared. Now he thought that if they found the landlord and tenant were too rigid in the terms of the lease, some allowances might be conceded. It appeared to him that tenants having large capital had also intelligence enough to protect themselves. But the small class of tenants were more dependent on their landlords. With reference to the large capital tenants, the landlords were as dependent upon the tenants as the tenants were upon them. He thought that if they drew tight those rules of extended agreements, they might do injury to the small tenants. The small farmers occasionally not only left no unexhausted improvement, but left behind them an exhausted soil. But if they had the tenant-right on the one hand they had the right of the landlord upon the tenant for the exhausted soil, and that demand might fall heavily on the poorer classes of farmers. He wished persons to understand each other, and they should have a perfect right to this. He thought that leases were good to the large farmer; but whether they were advantageous to the smaller farmers was a question. He did not think it would be judicious in legislating on the subject to enforce this principle of tenant-right in their case. Mr. Canning had said that it had been remarked of the advocates of freedom of conscience that they forced conscience into freedom. He knew there was generally an advantage in taking a lease in Scotland. There a great stride had been made, perhaps beyond what had been done in England; but he concurred in what had been said by the noble duke. He believed that a system of compensation for unexhausted improvements would be a more genuine mode of meeting the difficulty than giving a number of years on the tenancy, if anything should turn out to the advantage of the tenant. Anything which should be proved to be mutually beneficial to landlord and tenant, he should support. In the doctrines of free trade he did not believe; he never had believed in their efficacy, and he feared he was obstinate in his conviction. At the same time, he was willing to wait two or three years. His belief was, that to the present monetary system many had fallen victims; but as the manufacturing and great commercial interests were only floundering about in the mire, they would, perhaps, hereafter, come to parliament to relieve them from the disasters which they had brought upon themselves. With a view to test what had been done by the free trade in corn, he had ventured in parliament to move for a return of the number of

quarters of grain which had been imported in the last eighteen months, showing the amount month by month, with the total. They were told in the discussions on the repeal of the corn laws, when some members suggested that there would be a very large importation from foreign countries - that there might be 3,000,000 quarters imported, or at the very outside 4,000,000 in some emergency. That emergency had arisen, and, instead of 4,000,000 quarters, or even 5,000,000 quarters, we had imported 12,000,000 within the last twelve months, thus utterly falsifying the prophecy of the disciples of free trade.

Mr. A. STAFFORD wished to make a remark on the distinction mentioned by Mr. Baker between the claim for tenant-right in England and Ireland. Ireland was not, in respect to tenant-right, more distinct from England than Ulster was from the three other provinces; and, probably, the tenant right Mr. Baker referred to was the tenant-right of Ulster, which right was traced back to some historical origin, and required of the in-coming tenant or the landlord, sometimes as much as £40 per acre to compensate the outgoing tenant. There was no system of tenant-right in the three other provinces in Ireland; but its substitute was a system of outrages which disgraced, not only that country, but Christendom altogether. The land in Ireland would yield only in proportion to the labour bestowed upon it, in obedience to that sanction of divine origin, "In the sweat of thy brow shalt thou eat bread." There could be no distinction of principle between the labour, skill, and capital employed on the land in both countries, and therefore whatever principle was sanctioned with regard to Ireland, it must also be applied to England. It was not, therefore, to be expected that the landed proprietors in either House of Parliament could fully [illegible] the Bill which her Majesty's Government announced their intention of introducing into Parliament. If a principle were sanctioned with regard to Ireland, nothing could postpone, for any length of time, the application of that principle to England. It might be modified and altered in its details; but, if once the Legislature interfered, and recognised the right of the holders of land in Ireland, who had made no stipulation with their landlords to compensation for improvements, the same right must be recognized in the other country also. He did not think the principle a vicious one; on the contrary, he thought it a good one. It had been generally discussed throughout the country, and if it did not interfere with that good feeling which ought to exist between landlord and tenant, and which was better than law, he could not conceive that it could be otherwise than good, and likely to lead to the superior cultivation of the land. Not only had the landlord a duty to perform to the tenant, and the tenant to the landlord, but both owed a duty to the country, namely, to make the land produce as much food as possible, for the benefit of the country at large. But what he had never been able to discover was, how the tenant-right could be advocated on the free trade principle. It might be consistent for the Protection Society to advocate such a system, but how the advocates of the *laissez faire* system—the system of non-interference in commerce—could ask the government to step in and more or less control and direct the management of every individual farm in the kingdom he could never understand; nor had he ever met with a free-trader who could explain it (Hear, hear).

The proceedings then terminated.

PRIZES AWARDED AT THE SMITHFIELD CLUB.

Judges of cattle and long-wool sheep—Mr. Samuel Bennett, of Bickerings Park; Mr. W. Torr, of Riby; Mr. Ralph Oldacres.

Judges of short-wool sheep and pigs—Mr. James Burgess, Ridlington Park, Uppingham; Mr. Robert Boys, of Eastbourne; Mr. Brine, of Dorchester.

OXEN OR STEERS.

CLASS 1.—The prize of £20 to His Grace the Duke of Rutland, of Belvoir Castle, Grantham. The silver medal to the breeder is awarded to His Grace the Duke of Rutland. The second price of £15 to Mr. Joseph Stratton, of Manningford Bruce, near Pewsey, Wilts. The third prize of £10 to the Right Hon. Lord Portman, of Bryanstone, near Blandford.

CLASS 2.—The first prize of £30 to Mr. W. D. Manning, of Rothersthorpe, near Northampton. The silver medal to the breeder is awarded to Mr. W. D. Manning. The second prize of £20 to Mr. Isaac Taylor, of Monkmoor, near Shrewsbury. The third prize of £10 to Mr. Wm. Trinder, of Wantage, Berks.

CLASS 3.—The first prize of £15 to Mr. J. S. Bult, of Dodhill House, Kingston, near Taunton. The silver medal to the breeder is awarded to Mr. Bult. The second prize of £10 to the Right Hon. Lord Portman, of Bryanstone, near Blandford.

CLASS 4.—The first prize of £10 to Mr. John Wippell, of Brenton, Exminster, Devon. The silver medal to the breeder is awarded to Mr. Wippell. The second prize of £5 to Mr. T. W. Fouracre, of Durston, near Taunton.

CLASS 5.—The prize of £10 to the Right Hon. the Earl of Leicester, of Holkham, Norfolk. The silver medal to the breeder is awarded to the Right Hon. the Earl of Leicester.

CLASS 6.—The prize of £10 to His Royal Highness Prince Albert, of Windsor Castle.

The gold medal for the best ox or steer in the 1st, 2nd, 3rd, 4th, 5th, and 6th Classes to Mr. W. D. Manning, of Rothersthorpe, near Northampton.

COWS AND HEIFERS.

CLASS 7.—The first prize of £20 to the Right Hon. the Earl of Radnor, of Coleshill, near Farringdon. The silver medal to the breeder is awarded to the Earl of Radnor. The second prize of £10 to Mr. J. L. Hassall, of Packington, near Ashby-de-la-Zouch. The third prize of £5 to Mr. H. Frampton, West Chillow, near Wantage, Berks.

CLASS 8.—The first prize of £20 to Mr. J. T. Smith, of Thornby Grange, near Guildsborough, Northampton. The silver medal to the breeder is awarded to Mr. J. T. Smith. The second prize of £10 to Mr. William Trinder, of Wantage, Berks.

CLASS 9.—The first prize of £15 to Mr. Thomas Penson, of Foxcotte, near Chipping Norton. The silver medal to the breeder is awarded to the executors of the late Mr. W. Harbidge. The second prize of £5 to Mr. Trevor Yates, of Sapperton, near Sudbury.

The gold medal for the best cow or heifer in the 7th, 8th, and 9th Classes, to the Right Hon. the Earl of Radnor, of Coleshill, near Farringdon.

LONG-WOOL SHEEP.

CLASS 10.—The first prize of £20 to Mr. John Painter, of Burley, near Oakham. The silver medal to the breeder is awarded to Mr. Painter. The second prize of £10 to Mr. Thomas Twitchell, of Willington, Beds. The third prize of £5 to Mr. J. S. Burgess, of Holme Pierrepoint, near Nottingham.

CLASS 11.—The first prize of £20 to Mr. Thomas Twitchell, of Willington, Beds. The silver medal to the breeder is awarded to Mr. Twitchell. The second prize of £10 to the Most Hon. the Marquis of Exeter, Burley Park, Stamford. The third prize of £5 to Mr. J. S. Burgess, of Holme Pierrepoint, near Nottingham.

The gold medal for the best pen of one-year-old long-wool

sheep in Classes 10 and 11 to Mr. Thomas Twitchell, of Willington, Beds.

CROSS-BRED SHEEP.

Class 12.—The first prize of £10 to Mr. John Hitchman, of Little Milton, near Wheatley. The silver medal to the breeder is awarded to Mr. Hitchman. The second prize of £5 to Mr. Charles Tomson, of Sundon, near Luton, Beds.

SHORT-WOOL SHEEP.

Class 13.—The first prize of £20 to His Grace the Duke of Richmond, of Goodwood. The silver medal to the breeder is awarded to His Grace the Duke of Richmond. The second prize of £10 to Mr. William Rigden, of Hove Farm, near Brighton.

Class 14.—The prize of £10 to His Grace the Duke of Richmond, of Goodwood, near Chichester. The silver medal to the breeder is awarded to His Grace the Duke of Richmond.

Class 15.—The first prize of £20 to His Grace the Duke of Richmond, of Goodwood. The silver medal to the breeder is awarded to His Grace the Duke of Richmond. The second prize of £10 to Mr. Samuel Webb, of Babraham, near Cambridge.

The gold medal for the best pen of one-year-old short-woolled sheep in the 13th and 14th Classes to His Grace the Duke of Richmond, of Goodwood.

PIGS.

Class 16.—The first prize of £10 of Mr. Edward Whitfield, of Snaresbrook, near Wanstead, Essex. The silver medal to the breeder is awarded to Mr. Whitfield. The second prize of £5 to the Right Hon. the Earl of Radnor, of Coleshill, near Farringdon.

Class 17.—The first prize of £10 to His Royal Highness Prince Albert, Windsor Castle. The silver medal to the breeder is awarded to His Royal Highness Prince Albert. The second prize of £5 to Mr. Edward Whitfield, of Snaresbrook, near Wanstead.

The gold medal for the best pen of pigs in the 16th and 17th Classes to Mr. Edward Whitfield, of Snaresbrook, near Wanstead, Essex.

EXTRA STOCK.

The silver medal, for the best long-wool sheep, is awarded to Mr. Jos. Allison, of Bilby. The silver medal, for the best short-wool sheep, is awarded to Mr. G. S. Foljambe, of Osberton Hall, near Worksop. The silver medal, for the best pig, is awarded to Mr. James Peto, of Heston, near Hounslow.

COMMENDATIONS.

The Judges highly commend—Mr. J. Clover's, of Newmarket, steer; Mr. Charles Large's, of Lechlade, ewe; Mr. Foljambe's, of Oberton Hall, near Worksop, wethers; Mr. Peto's, of Heston, near Hounslow, pigs.

The Judges commend—Two oxen belonging to His Royal Highness Prince Albert; Mr. John Wippell's, Exminster, steer; Mr. Bult's, Dodhill House, near Taunton, steer; Messrs. Martin's ox; Mr. John Tucker's steer; Mr. John Wippell's steer; Mr. Hudson's, of Castle Acre, cow; Major-General Calvert's, of Ware, Herts, heifer; Mr. John Moon's heifer; Sir Thomas Whichcote's cow; His Royal Highness Prince Albert's cow; Mr. W. de Capel Broke's, of Oakly, near Kettering, cow; Mr. William Yeoman's cow; Mr. Thomas Street's wethers; Mr. John Painter's, of Burley, near Oakham, wethers; Mr. Painter's wether; Mr. Beman's, of Donnington, near Stow, wether; Mr. J. Williams's wethers; Mr. Webb's, of Brabraham, wethers; Mr. Shelly's, of Maresfield Park, near Uckfield, wethers; Mr. Overman's, of Weasenham, sheep; Mr. Barnard, M.P., of Gosfield Hall, pigs; Mr. Hayward's pigs.

The Judges generally commend Class 12.

EXHIBITION OF IMPLEMENTS AT THE SHOW OF THE SMITHFIELD CLUB.

The exhibition of implements this year was larger than at any former period. The newest improvements made by the several celebrated makers were amongst them, and the anxious and crowded spectators evidently were much pleased at the simple but effective mechanical improvements in the different chaff-cutters, corn-bruisers, drills, and other machines exhibited, by means of which in some cases less than half the power formerly necessary will now suffice. The profession of mechanics, now running so honourable a career in furthering the culture of the soil, and aiding the natural powers of man by making the barren wastes to become cultivated fields, was never exhibited in greater perfection. No person can question but the inventors of many of these implements have aided greatly in economising the various operations of husbandry, while the addition of steam power to the preparation of corn for market is made subservient not only to that process, but by a simple and easy arrangement to other farm purposes, and can be removed from one farm to another with as much ease as a farm waggon. Want of space compels us to be brief in our notice, and should we omit to enumerate any it must be placed to this account:—

The stand of Messrs. Garrett and Son, of Saxmundham, was very large, and attracted the usual attention. Their drills for different purposes were much admired, as was also Weller's hand-pipe and tile machine, manufactured by this firm; it obtained prizes in this country and in Ireland. There were also various drag-rakes, rollers, cake-crushers, &c., of every description. The stand occupied by Mrs. Mary Wedlake, of Hornchurch, Essex, and Fenchurch-street, London, was the object of much attraction. The haymaking machines, horse-power thrashing-machines, ploughs, and specimens of iron-gates, fences, &c., were manufactured evidently with fine finish. The gorse-bruising machine, worked by a man and boy, prepares that vegetable as food for cattle, reducing it by a single working to a moist and pulpy state. R. Honsby, of Spittlegate, Grantham, Lincolnshire, exhibited his portable steam-engines and horse-power thrashing machines: his different drill and dibbling machines were also much admired. Bewley, of Chelmsford, Essex, had several crushing and dressing machines, portable thrashing machines, &c., &c. Messrs. Barrett, Exall, and Andrews, of Reading, exhibited ploughs for heavy and light lands, and which were apparently well calculated for their respective purposes. They exhibited also circular harrows, chaff-cutters, dibbling machines, &c., &c., at this stand. Messrs. Deane, Dray, and Deane, of Arthur-street, London-bridge, engineers and

millwrights, exhibited several machines in connection with their department, such as corn-mills, corn-crushers, dibbling-mills, gorse and chaff-engines, cow-cribs, horse and sheep racks, &c., &c., all adapted to the saving of labour. Their hand dibbling-machine, which obtained a prize of £5 at the Newcastle meeting of the Royal Agricultural Society, excited much interest. Davis, of Hemel Hempstead, exhibited some ploughs and drills, &c., as did James Comins, of Southmolton. Wedlake and Thompson, of Hornchurch, exhibited several chaff-cutting and other machines, and a haymaking-machine, which obtained a prize at Derby and Shrewsbury. William Hensman's (of Woburn) drills, chaff and turnip cutters, ploughs, scarifiers, &c., were much admired. Messrs. Cottam and Hallen, of Winsley-street, London, had a numerous and valuable assortment of ingenious machinery manufactured by them; ploughs, grubbers, scarifiers, and chaff-cutting machines in great variety: their draining tools and pug-mill were also much looked after. The ploughs exhibited by John Howard and Son, of Bedford; J. Warren, of Maldon; J. C. Grant, of Stamford; William Busby, of Newton-le-Willows; E. H. Bental, of Heybridge, near Maldon; Sanders and Williams, of Bedford; and William Smith, of Kettering, were all well adapted to the purposes for which they were manufactured, and were examined by a great number of persons. Mr. Grant's horse-rake, an implement of acknowledged utility, obtained a full share of notice. The chaff-cutting machines of Gardner, of Banbury; J. Gillet, of Brailes, near Shepton-on-Stour; S. Smith, of Northampton; Smith and Co., of Stamford; Cornes, of Barbridge, near Nantwich; and Howard, of Bedford, were in usual numbers and quality. The Banbury turnip-cutter seemed to have lost none of its well-earned reputation. The expanding-lever harrow manufactured by Coleman, of Colchester, a very important implement, a description of which will be found in the *Farmers' Magazine*, of February, 1846, was much noticed; as was the roller-mills of W. P. Stanley, of Peterborough; of J. Wood, of Stowmarket; and of Richard Clyburn, of Uley, near Dursley: these mills can be so arranged and set as to break and crush every seed and grain which in feeding cattle is so well known to be necessary, as no animal will sufficiently masticate his food as to obtain that nutriment which is derived from it when crushed. The prize steam-engine of William Cambridge, of Market Lavington, as well as its rivals, manufactured by Ryland and Dean, and other eminent manufacturers, were exhibited. James Smith, of Witham; A. W. Gower and Sons, of Hook, near Hartfordbridge; and Thomas Chandler, of Stockton, Heytesbury, exhibited seed and manure drills for depositing the corn and manure. Phillips (of Bristol) exhibited a horizontal turnip-cutter, which obtained a prize of £5 at Shrewsbury. The implements exhibited by J. Spring, of Brampton; John Hedges, of Bucklesbury, near Reading; and Gill and Ward, of Oxford, were numerous and of great utility. The exhibition of glass milk-pans, &c., &c., manufactured by Welsh and Co., of Panton-street, Haymarket, and Geo. W. Kirkby, of Old-street Road, as well as bee-glasses, wasp-traps, preserve-glasses, &c., &c., &c. attracted great crowds of spectators: their extraordinary cheapness must bring them into universal adoption. The asphalted felt for roofing, manufactured by T. J. Croggon, of Laurence Pountney-hill, adapted for roofing of buildings, covers for sheds, or other temporary erections, was in great variety. Messrs. M'Neill and Co., of Bunhill-row, London, exhibited their patent asphalted felt for roofing, as is their usual practice. Their stand was crowded with a variety of models illustrating how very cheaply every form and kind of roof can be constructed, economy of timber, &c., when intended to be covered with the asphalted felt for roofing. These various plans are also well illustrated in their pamphlet, which they, on application, give, or send by post, gratis. The works are in Bunhill-row, London, and it appears theirs are the only manufactories in London or Great Britain where this description of roofing is made. This felt as a roofing has been awarded two prizes at the national agricultural shows; and Her Majesty's Woods and Forests have tested its utility for three years. Benjamin Edgington, of Duke-street, Southwark, had several handsome specimens of rick-cloths, marquees, &c., which were much sought after. Besides the tile-machine of Garrett and Sons before referred to, there were also crowds assembled round the other stands containing tile-machines while at work—namely, Sanders and Williams, of Bedford; Hatchers, Benenden, manufactured by Cottam and Hallen, of London; the Archimedean, manufactured by Franklin, of Lucas-place, Commercial-road East; William Bullock Webster's, manufactured by Tasker and Fowle, of Andover; the Ainslie machine, made at the Company's works at Alperton; and Clayton's, of Upper Park-place, Dorset-square. The mechanical appearance of each of these several candidates for public favour, as well as their efficient working, drew forth several remarks of approval from the landowners and farmers, who evidently were anxious to make themselves acquainted with the best and cheapest machine for the purpose of making tiles and pipes requisite for the operation of draining. Burchfield and Son, of Smithfield-market; Marriott, of Fleet-street; and Smart, of Oxfordstreet, exhibited weighing-machines suited to the weighing of cattle, corn, &c. The specimens of mangold-wurtzel, turnips, &c., exhibited by Thos. Gibbs and Co., of Halfmoon-street, were deservedly much admired. The large, long, red mangold-wurtzel and the yellow globe were of extraordinary size, and are highly sought after for their immense produce. The fact of this firm being the *specially appointed* seedsmen to the Royal Agricultural Society is a sufficient guarantee of the reputation of this well-known old-established house. Robert Matson, of Wingham, Kent; George Gibbs and Co., of Down-street, Piccadilly; William Skirving, of Liverpool; and F. Chatham, of Plumstead, near Woolwich, had each very fine specimens of various kinds of seeds, roots, &c., &c. We will conclude our remarks of this exhibition by alluding to two other stands—that of Vingoe, of Penzance, and Bigg, of London. The patent seed-planting machine of the former was much admired, several bearing testimony to its value and useful-

ness; while the sheep-dipping composition of the latter is proved by testimonials, which are beyond a contradiction, that it is invaluable as a remedy for preventing the fly, and removing tick, scab, and lice, while there cannot be the slightest danger either in preparing the bath or in the operation of dipping.

ON THE NECESSITY OF A MORE ENLIGHTENED AND EXTENDED SYSTEM OF AGRICULTURAL EDUCATION.

Sir,—The importance of the subject to which I would direct the most serious attention of the agricultural community is, I am sure, a sufficient apology for intruding my observations to your notice.

Education, properly directed, has such an immense influence, not only on individuals, but on classes and the nation at large, that I am impelled by a sense of duty to our country, to drag the subject before the unwilling attention of the farmer.

Though there are a few exceptions in enlightened quarters, yet the notion is too prevalent among some farmers that the so-called education which they themselves received when young is quite sufficient for the rising generation. Such men are content that while the other classes of the country are receiving an education in some measure suited to their intended pursuits in life, that their children shall be allowed to enter into the great arena of life in a great measure defenceless, compared with the mailed and armed antagonists with whom they will have to cope; they are content that with an inferior amount of knowledge their children shall be left to contend with those who will bring a superiority of science with at least an equality of practice. The results of such lamentable oversight or ignorance will be that the original cultivators of the soil will be as effectually driven from their ancient possessions as were our barbarous ancestors by the strategy and skill of the legions of the victorious Romans.

It is to prevent the inevitable effects of such short-sightedness that I would endeavour to inform the minds and arouse the fears of the present generation of farmers, in order that their offspring may at least have some opportunity given them to prepare in a suitable manner for the difficulties which they will hereafter encounter. It is not in the order of things that for the future the farmer can successfully proceed without increasing his knowledge of science. The farmer's pursuits are closely connected with Nature's operations; yet how often is he found, from ignorance of her laws, engaged in an unequal contest against her! The most varied phenomena influence in turn the produce of his farm on the amount of his profits. While full many a farmer rests in happy ignorance of their existence, the most active chemical affinities are at his work in his soil, in his manure, in his crops;—the earth which he cultivates contains within itself the marks of its origin, which indicate the operations and changes which it has undergone, but to him they exist as does the landscape of nature to the eyes of the blind. Of the structure and functions of the different organs of the plants which he cultivates, or of the animals which he feeds, he entertains ideas most mysteriously confused; and, in fact, though Nature is working around him and for him, yet he is often totally unacquainted with the powers and extent of her operations.

And why all this? Because he has never yet had the eyes given him rightly to observe. He has never been made acquainted with the means which *practice in science* has pointed out as the best means of observing and detecting truth. His mind has never undergone that intellectual discipline which not only strengthens its subject, and gives power in the search after truth, but which also most efficaciously assists in the detection and overthrow of error. He has not been armed so strong in the truths which science has discovered, as to be able to cope with the power by which ignorance is so obstinately defended. Truth and error are often with him the same, for want of the means of distinguishing them: and effects are constantly referred to causes, to which they have not the most remote relation. In fact, in how many instances are his views narrow, his ideas limited, his knowledge small, his ignorance unbounded!

My remarks may, by many, be thought too severe; but though generally throughout the country there are many bright examples to the contrary, and while many counties are distinguished by the eminent agriculturists they have produced, yet I am persuaded, from my own experience, of the general application of my remarks.

It is now nearly ten years since I began in my public lectures to call the attention of the farmer to the necessity of a more enlightened plan of education, and the views I then and since have continually inculcated have been carefully put in practice in our own school. It is a mark of the advance which this question is making, that many other establishments have since arisen, who have directed their attention to an improved agricultural education; *but what are these among so many?* While antiquated plans for the dissemination of useless information continue to be acted upon by far the great majority of country schools, and until a better system be extended to them, the advantages of science must necessarily be limited to a few. And the thinking farmer should bear it in mind, that so long as he continues to be content with the miscalled education which most schools afford, so long will he find few masters who will make much innovation in their plans by the introduction of more improved methods, and a more extended series of studies.

The sciences of chemistry, botany, and geology unfold to the mind so many new views, impart so much information, and are in every way so adapted to assist the farmer in improving his practice, and forming a rational system of agriculture, that they can be no longer with

safety neglected as a part of the education of the rising generation of agriculturists. And whenever we find the farmer insisting that his son be made acquainted with these sciences, we shall soon find a reformation in the provincial schools of this country.

Whilst, however, I persist in asserting that an improved education to the farmer is imperative in these ever-moving times, in order to a rational plan of agricultural proceedings, yet I must, in justice, point out that some members of another class of this great nation are almost as much in want of a certain species of education as the most ignorant farmer. I allude to certain of those gentlemen who occupy the position of landlords in this country. I approach the notice of this subject with becoming decorum and reverence, and I duly appreciate the hearty endeavours of many good and worthy individuals of this class of the community for the benefit of the agricultural interest. But many of this class are in need of a more practical and extended education. They require to know *something* about the nature of practical farming. A knowledge of the laws of nature, as exemplified in phenomena of the farm and the dung heap, would wonderfully benefit the owners of the soil, and perhaps prove no impediment to the happiness of the tenant. To what but an almost absolute ignorance, not to say of an enlightened system of agriculture, but even of the ordinary facts and principles of every-day farming, can we impute the existence throughout the country of antiquated leases and agreements, containing the most absurd and nonsensical restrictions upon the tenant in the use of his farm? When we see a farm in bad condition, the land undrained, the fields unweeded, the barns unthatched, the eaves unspouted, and the weather-washed dung heap, it behoves us to ask whether these misfortunes to the community arise from the ignorance of the landlord or the incapability of the tenant. The fault is probably as often on the one side as the other.

Before, therefore, the landlords can with consistency and effect come before their tenantry as advocates of an improved system of education, it will be necessary that they shall throw overboard all those ridiculous restrictions which prevent the tenant from even exercising the knowledge he already possesses. And if the landlord will not himself undertake the permanent improvement of the buildings and of the farm, he ought certainly to throw no impediments in the way of the tenant, by denying him a proper security for the capital which he would be willing to expend on necessary and advantageous improvements. It is therefore to be hoped that the owners of the soil will turn their attention to the abrogation of all vexatious impediments to agricultural improvement, and that for the good of themselves and the country to which they belong, they will allow scientific and practical knowledge, free and unrestricted liberty of action, in the production of the necessaries of life.

But even though knowledge be increased, and opportunities be given, and seed be sown, and a return be expected, yet if the harvest be not gathered in, the labour will be wholly in vain. It therefore would not be amiss for some of our enlightened and generous landlords to employ their arithmetical knowledge and mathematical capabilities in the pleasing task of calculating the amount of which the tenant farmer is annually defrauded by the unlimited preservation of game.

Though last not least, the education of the agricultural labourer is a matter of the highest importance. It will not be denied, that if he were to receive an education adapted to the practical operations he subsequently will be called upon to perform, the farmer himself would be greatly benefited by the increase of intelligence and skill his workmen would undoubtedly possess. It is therefore to be hoped that the wants of this class of the community will not be overlooked, but that the light of science and of truth, whilst it illuminates the palace and the mansion, may be permitted to dissipate the gloom and darkness of the cottage.

In conclusion, I trust public attention will become strongly aroused upon the subject of education; that information and knowledge of a proper kind will be more widely disseminated; that "practice with science" (that phantom of the imagination, so often heard of, and so seldom seen) may in reality become a denizen of our land; and that the energies and talents of all may in their proper spheres be directed to the improvement of the industrial resources of the country, to the increase of the physical comforts of the people, and to the intellectual and moral advancement of the nation.

J. C. Nesbit.

Agricultural and Scientific School,
Kennington, December 20th, 1847.

WIREWORM.—The *Essex Herald* publishes a letter from the Rev. G. Wilkins to a farmer, who wrote to him, inquiring how the wireworm had been exterminated on the rev. gentleman's land—

"Some ten years since, when I came to my living, and commenced cultivating the little land I hold, it was, I may say, full of wireworms. Nothing could have been worse, for my crops were in some places ruined by them entirely. What, then, did I do? I adopted a plan which I recommended and published in periodicals many years since, namely, of encouraging moles and partridges on my lands. Instead of permitting a mole to be caught, I bought all I could, and turned them down alive; and soon my fields, one after another, were full of mole-hills, to the amusement of all my neighbours, who at first set me down for half a lunatic; but now several adopt my plan, and are strenuous advocates of it. My fields became exactly like a honey-comb; and this continued even among my standing and growing and ripening crops; not a mole was molested, but I still bought more. This summer I had 14 brought, which I turned down, but they were not wanted; I have nothing for them to eat—all that moles live upon is destroyed—and so, poor things, they must starve or emigrate to some distant lands, and thus get bowstringed by savage men, whom they aim to serve. Adopt my plan, and it will be sure to answer. If you have a nest of partridges, also encourage them; all the summer they live on insects, on wireworms, &c.; and consider how many millions a covey will destroy in a single summer. Again: always remember that moles feed upon insects, and of which the wireworm is the chief; if you doubt this, open a mole and peep into his stomach. Again: do not

fear that moles injure your crops either in field or garden; it is a low and vulgar error to suppose that they root up young corn; they never go anywhere until the wireworms have first destroyed the plants, and then, innocent things, they are punished for others' faults! If you do not like to see their hills, knock them about with a hoe, as I did; it is a healthful amusement, and they will do your lands good. Do not despise my plan because the farmers will not adopt it in your neighbourhood: farmers adopt nothing till driven to it, and nothing that is new and good. Again: have you the aphis, or white bug, on your apple-trees? If so, do not kill ants; my trees were full of aphides, but I found the ants came to my help, and I welcomed them, and now I have not an aphis on my trees."

STEWPONEY AGRICULTURAL SOCIETY.

PRESENTATION OF TESTIMONIAL.

On Tuesday, Dec. 21, the general meeting of the above society took place at the Stewponey Inn, at two o'clock. The accounts having been audited, the secretary's report of the general progress of the society received, and the amount of premiums fixed, W. L. Childe, Esq., of Kinlet, was elected president for the ensuing year. At four o'clock the party sat down to an excellent dinner, provided in the usual good style of host Mantle; J. H. H. Foley, Esq., M.P., the president, in the chair. Amongst those present we observed—G. Bate, Esq., C. Grazebrook, Esq., E. Rogers, Esq., Rev. G. Wharton, Messrs. E. Smith, Shutt, J. Wilson, E. Pratt, Mantle, J. Yardley, J. Beddard, J. Corbett, J. H. Windle, B. Brooks, Hands, G. Thompson, G. Thompson, jun., E. Smith, &c.

After the President had proposed the usual loyal toasts he called on Mr. Wilson to proceed to the principal business of the day, namely, the presentation of a testimonial to Mr. Thompson, the worthy and indefatigable assistant secretary of the society. This consisted of a beautiful silver snuff-box, manufactured by Keeley, of Birmingham, accompanied by a purse of £100. The box is very neat, and has the following inscription engraven upon it:—

"Presented to Mr. George Thompson, of Prestwood, with a a purse of one hundred sovereigns, by the members of the Stewponey Agricultural Society, in token of their respect and appreciation of his services as their assistant secretary. December 14th, 1847."

Mr. Wilson, in presenting the testimonial, said: "Mr. President and Gentlemen—The testimonial about to be presented, I believe, originated with a few individuals, members of the society, who, taking (as I conceive) a very proper view of Mr. Thompson's situation as secretary, and the very satisfactory and laudable manner in which he had performed the duties of that office for so long a period (and that entirely gratuitously) considered that the valuable services he had rendered the society fully justified them in proposing that some reward, or, at least, some token of gratitude and respect, should be offered him. The idea thus conceived was immediately acted upon, and although it entailed some little labour, and the devotion of a considerable portion of time on the part of those who undertook the task, we feel fully compensated in the pleasure and satisfaction we have in being able to give you so favourable an account of the result, by informing you of the very handsome and liberal manner in which our appeals to the members generally have been responded to. And when I inform you that the amount of subscriptions received exceeds £100, and that they were given, not grudgingly, but cheerfully, many of them accompanied with sentiments and expressions most honourable to Mr. Thompson, and showing clearly the high estimation in which he was held, and stating also the great pleasure the parties felt in being thus afforded an opportunity of testifying their respect, I think, gentlemen, that you will agree with me in believing that the steps we took were not imprudent ones, and were in accordance with the feelings of the society. Gentlemen, having thus given you a brief statement of the origin of this testimonial, and the circumstances connected with it, I now proceed to a very pleasing portion of the task I have undertaken, viz., the presenting to Mr. Thompson a piece of plate, and a purse of 100 guineas. Mr. Thompson, it now becomes my pleasing duty to present to you, in the name and on behalf of the Stewponey Society, this testimonial, consisting of a silver snuff-box and a purse containing 100 guineas. And when I show to you (as I purpose doing) a list of the subscribers, together with the sentiments accompanying many of the subscriptions, I doubt not that you will feel not only highly complimented but pleased, in believing that you have merited, or at all events obtained, the good will and esteem of the members of the Stewponey Agricultural Society. Your position this day, Sir, is one of which you may feel justly proud; for although pride is seldom to be tolerated, it is in your case, and under the circumstances in which you are placed, not only allowable but highly honourable; and therefore it is that I say you may be justly proud; for I cannot divest myself of the opinion I have long held, nor can I bring myself to believe, that, by any possibility, a man can be placed in a more honourable situation than that of possessing the confidence, respect, and esteem of his fellow men. Sir, the inscription on the box is sufficiently significant to show, without any further explanation on my part, the position you occupy in the society; and the plate and purse, although valuable in themselves, sink into insignificance when compared with the feelings of respect for you testified by their presentation. I now, Sir, have only to add my earnest wish that you may live to enjoy and continue to deserve those kindly feelings which have been shown to you; and that you may, after

doing so for very many years, hand down to your posterity this piece of plate, as a token of that respect you have merited and received from this society:—and may it stimulate them, when bereft of your example, to follow up the same honourable course, of which the inscription will remind them." (Cheers.)

Mr. THOMPSON then rose and replied as follows: Mr. President, Mr. Wilson, and gentlemen,—I can assure you that I am so deeply impressed with a due sense of your kindness on this occasion as to be quite unable to express my gratitude for the unexpected, and I fear undeserved, honour you have been pleased to confer on me. I can only say, gentlemen, that I thank you most sincerely for the very handsome testimonial you have this day presented to me, and for the good wishes and too flattering observations you have addressed to me. I little expected that any humble services I may have rendered this society could have been considered worthy of so handsome a return; particularly as it was by Mr. Foley's wish that I first became connected with it. Gentlemen, I feel that it is to Mr. Foley you are indebted for whatever has been done by me; he has guided everything, his anxiety has been unceasing, and by him has all the most difficult part of the duties been performed. I have felt the highest possible degree of pleasure in assisting to carry out his excellent objects. As I have for the past, so I shall for the future, still endeavour to the best of my humble abilities (so long as I may have the opportunity) to assist him in discharging the duties of secretary, and in promoting those objects which I know he has so much at heart. Gentlemen, I do, indeed, feel proud of this testimonial—whilst I live it will stimulate me to further exertions in the paths of usefulness; and I hope the gratitude its possession will engender in my mind may have a tendency to make me daily a better man, and a more useful member of society. At my death it will descend to my children, and I hope neither I nor they will ever be undeserving possessors of this memento of your kindness. Gentlemen, I thank you very sincerely for the great honour you have conferred upon me, and for the patience with which you have indulged me; and I also thank all other members of the society who are unavoidably absent for their liberality in subscribing towards this testimonial; and I beg to assure you that I am at all times most anxious to promote the welfare and usefulness of this society (cheers).

The evening was spent in the most convivial manner, and the enjoyments were continued to a late hour.

THE LONDON FARMERS' CLUB.

MONTHLY MEETING OF THE COMMITTEE OF MANAGEMENT.

MONDAY, DEC. 6, 1847.

Present—Messrs. E. Aitcheson, G. Emery, W. Fisher Hobbs, T. Knight, J. Hudson, J. Beadel, W. Shaw, of the Strand, R. Smith, of Burley, and J. Pain. W. Shaw, Esq., in the chair.

The minutes of the last meeting were read, confirmed, and signed by the chairman of this day.

The following gentlemen were elected members:—
Mullens Dennett, Lodsworth, Petworth, Sussex.
T. Gosden, Midhurst, Sussex.
Henry Littler, Waltham Abbey.

The names of seven other gentlemen proposed as members were read for the first time.

Mr. Shaw, of the Strand, was chosen Chairman, and Mr. Robert Smith, of Burley, Vice-Chairman of the Discussion Meetings for the ensuing year.

A letter from Mr. B. Almack on "Tenant-Right," was read and discussed, and the secretary was directed to address a letter to Mr. Almack thereon.

ANNUAL GENERAL MEETING.

THURSDAY, DECEMBER 9.

W. Shaw, Esq., in the chair.

The following report from the committee of management was read, received, and adopted.

REPORT OF COMMITTEE.

DECEMBER 6TH, 1847.

In presenting the Annual Balance Sheet, the Committee see every season for congratulating the members and well-wishers of the Club on the progress it has made during the past year. The Institution has advanced in all ways. The propositions emanating from it have been met with far more than usual energy, and consequently been attended with greater effect. Indeed its proceedings are now watched with an interest, by the press and the public, that must tend much to strengthen the Club in that position it ought properly to occupy.

The support the Club has this year received by the accession of new members much exceeds that of any preceding one. Eighty-seven new names, comprising some of the most influential agriculturists, have been added to the list; thus making in all a total of four hundred and forty-five *bona fide* members. At present there is every promise of as progressive an increase; and the committee can only urge members to individually recommend the club to their friends on its true principles—as a home or head-quarters for the Farmer in one point of view, and as a champion or guardian of his interest in another.

The arrears in actual amount are nearly equal to those uncollected at the close of 1846; in their nature, however, they are materially different. Last year a large number of subscriptions had been standing due for two, three, and four years; while the arrears now outstanding are nearly all subscriptions due for the present year. On this point the committee can consequently report with much satisfaction.

It will be observed that the expenditure of the year has been rather heavy; still a reference to the different items will show that this increased outlay has only been incurred in advocating and disseminating those opinions which full meetings of the members have pronounced sound and wholesome. This expense, mereover, is only temporary, though its result may be highly advantageous to the club and the whole agricultural interest.

The following members of the committee went out by rotation:—J. Bailey, W. Fisher Hobbs, W. Hutley, R. M. Jaques, Fielder King, T. Knight, E. Lewis, J. Oakley, W. Purser, J. A. Ransome, Owen Wallis, J. Wood.

Of whom there were re-elected as under:—W. Fisher Hobbs, W. Hutley, J. Wood, Fielder King, T. Knight, E. Lewis, J. Oakley, W. Purser, Owen Wallis.

The following gentlemen were also elected members of the committee:—J. Donaldson, J. Bravender, Jonas Webb, T. Owen, J. Smith (Rye), C. Stokes, W. Wingate, M. Nockolds.

A variety of other business connected with the management of the club was discussed, and referred to the committee.

REMEDIAL MEASURES FOR IRELAND.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—You advocate a system with respect to converting Irish poor-houses into agricultural self-supporting colonies, which I brought before the Government in 1821. There is no doubt that the Legislature has rashly forced upon Ireland the machinery of an English poor-law, to which our country is no more adapted than Otaheite or Kamptschatka. To introduce the idleness of an English workhouse into a country proverbial for sloth and want of employment, even without taking into consideration manifold circumstances connected with our statistics and national character, was an extreme error of judgment. But the deed is done; "*facilis descensus Averni, sed revocare gradum, hic labor, hoc opus est.*" Poor-laws and potatoes have produced in Ireland a "*bellum servile,*" which protects the noon-day assassin—extinguishes the rights of property—severs the connection between landlord and tenant, between capital and employment—and converts the Irish able-bodied labouring population into alms-asking beggers.

Our present Lord Lieutenant sees the rock on which we founder. Embracing his views, and those which have appeared in your able journal, I have addressed the following letter:—

TO THE IMPERIAL PARLIAMENT.

My Lords and Gentlemen,—The Lord Lieutenant of Ireland, after mature consideration, has come to the conclusion that the regeneration of Ireland must commence with improved agriculture and a change in the national dietary of the people. The cultivation and boiling of potatoes yields no employment to arts and manufactures, or scientific improvement of the soil, the absence of which is the deep-seated cause of the degraded agriculture of the country, and the want of industry, and the misery which prevades the people. In a million of Irish cabins there is not to be seen a manufactured article, with the exception of a metal pot, and a table, consisting of the cabin door removed from its hinges, and placed upon the bottom of a wicker basket. This may be thought an exaggerated picture, but it is unfortunately a true one. The fish on our coast, and all the esculents and cerealia which, if used as the food of the people, would give rise to improved farming, and to the arts and manufactures of civilization, never enter into the necessaries of life amongst those who live entirely upon potatoes. The people who wear no clothes can give no demand to cloth factories; and it is idle to accuse England with forging restraints upon ideal manufactures, to which we cannot give legitimate birth. The only manufacture which the circumstances of our country permits is agriculture; and my Lord Stanley, and many members of your honourable houses, can attest the barbarous and deplorable state in which that is conducted.

An apostle of the school of Irish grievance-mongers has asked the following question in the House of Commons:—"How did it happen that, with a genial climate, an industrious people, and a fertile soil, the Irish people, in this age of progress, were so far behind other nations not so highly favoured—that they alone were retrograding, while other countries were progressing in civilization?" Having answered his own question in an Irish-grievance-claptrap fashion, he gives utterance to the following more rational answer of his own problem:—"Instead of passing coercion bills, let them set the people to cultivate the land. The land was something. Let the Government proceed to base their measures upon a reality, and not on a fiction. He would quote the motto of the right hon. member for Tamworth:—'The science of agriculture was only in its infancy.' He Mr. F. O'Connor) had made this a household word in every cottage in England." How very patriotic to England is our Irish absentee! Why does he not make it a household word in every cabin in his own country, and the first and greatest of Irish grievances?

There is an antagonistic principle in the two religious creeds of Ireland, which impedes all improvement. The clergyman of one persuasion receives his tithes in proportion to agricultural improvement; while the clergyman of the other sect, and the much more influential amongst the people, receives his dues in proportion to the number of mud cabins with which the country is studded. He has, therefore, no interest in the clearance of estates, and his reason for denouncing such a system proceeds from his self-interest. Under such circumstances it is very difficult to obtain any co-operation in the suppression of those barbarous murders which have their origin in ejectments, or the illegal over-holding of land; but this is a subject I leave to the consideration of the Legislature.

Lord Clarendon has sent into the different counties of Ireland, practical peripatetic instructors, to teach the people practical agriculture orally. This plan is good as far as it goes, but it will never train up the rising generation to industry and agricultural knowledge as in Scotland, unless science be combined with practice. The people must learn not only to live by agriculture, but on the fruits of agriculture, "*fruges consumere.*"

National schools have been got up at a great national expense, in which the youth are taught to read, and yet you will never find a book in any of their cabins. Let the Government convert every national school in Ireland into model farms, with a piece of ground attached, and a lecturer, adopting the same system of teaching the boys while at work as I have seen practised at Hoffwell, by M. Fellenberg. Have a clever woman to teach the female children the art of cottage economical cookery; how to make Scotch brose, and pottages and porridges of the esculents and cerealia, like the peasantry of other countries. Convert the poor-houses of Ireland into self-supporting agricultural colonies, and have the children taught in them as in the national schools; and make the able-bodied not only to grow their own food, but to manufacture their own necessaries. In every instance where this has been attempted in an Irish workhouse by some enlightened guardian, the best results have followed. It is 26 years since when I recommended agricultural colonization upon bogs and wastes (in a pamphlet published in London in 1821), as the only rational system of poor-laws for Ireland, should it ever be found necessary to introduce them into that country. The columns of a newspaper is not the place to enter into details and to answer objections. I shall here only passingly observe to the political economists, that Ireland has no manufactures to be injured by rival works, carried on inside the walls of a workhouse.

The time of the imperial Parliament would be much better occupied by devoting it to the consideration of such practical measures as I have the honour to submit, than in listening to mock-heroic speeches, which dress up ancient political grievances as abstract causes of our present misery; but which, as cause and effect, have as much relation with it as Tenterden steeple with the Goodwin Sands.

My lords and gentlemen, the social system of Ireland is being completely overturned by a *reign of terror!* which has never been equalled since the French Revolution, and which, if permitted to progress, will completely frustrate all moral and physical improvement it may occur to your wisdom to devise.

With high respect,
I am, your very obedient,
W. Herbert Saunders.
Grenville-place, Cork.

POOR PRICE TO FRED. FARMER OF THE COPELANDS.

Letter II.

Dear Fred,—You're a precious old cove! Are you not? How much do you say it takes to keep your eight draught horses? A hundred pounds at the least? Why man! you may keep them on very little more than half that. Do'nt you go and be after supposing that I have some chemical preparation wherewith to blow them out; or that I keep them alive with a galvanic current and electric shocks. Nothing of the sort, sir. I feed them by steam! It's all the steam that does it; and without the steam, I should probably have to keep mine at the same expense as you do yours.

Now slacken your pace; trot along easy. I'll tell you how you must do. Get a good steam-engine to thrash with, if you have not one already; that will save your horses. Get a chopping-machine, and have it attached to the steam-engine—which can be done at almost any distance by means of a strap. Lastly, get a steaming-apparatus, which you should have in a house near the chopper, and supplied from the engine-boiler.

Now instead of giving your horses so much hay and corn, give them chopped hay (good clover hay is best) and oat-straw—half of each, and mix with them half as much wheat or other chaff, which you should always carefully preserve for that purpose, and not regard the old wife's fable, of its having no strength in it, and being only fit to bed pigs with; for it is all humbug. Put this into a tub on purpose, with as much boiling water as will cover it. Next, you must put some water to boil in your steaming apparatus, and throw into it one good handful of linseed, and two of Indian meal, for every horse; to the whole add a tablespoonful of soda. When it has boiled an hour with the lid on, mix it with the scalded chop, and give it to the horses just milk warm.

This is one receipt, but you must not confine yourself to one; horses have humours and whims

as well as human beings. They get tired of one unvaried kind of food; whereas a change produces a relish, which does as much to keep an animal in good condition as anything.

Take two measures of pig-potatoes, and steam them. Turn them into a tub on purpose. (Every tub should be kept for its own particular use). Add one measure of bran, one of bean meal or Indian meal, and one of kibbled oats previously steeped in cold water. Stir them well together with a little salt, and give this to the horses either warm or cold. If your horses do not feed as well upon this—aye! better, than upon nothing but plain oats, you may—no, you need not do anything: but if they don't its very queer, that's all.

Now do not suppose by all this, that I mean you to go and get all the different seeds and meals and all the rest of it. Nothing of the kind. Just use such things as you happen to have about the farm. For instance—if you have Indian meal, (which no farmer should be without) boil it up with finely chopped pea-straw and hay, and a little lindseed and soda are a great improvement. There is no waste in such mixtures as these: your hay will go four times as far as in the old system. But not your horses merely—your cows and fattening stock should be treated in a similar manner: and I do not doubt that if this system were thoroughly carried out, three times the quantity of stock might be fed, to what is at present kept on many remunerating farms.

The manner in which fattening stock are managed in this country at the present time is this: they are crammed with hay or oat straw—according to the custom of the locality—stuffed with turnips, and finally blown out with oil-cake. There's a plan for you? They call it feeding; but I should rather call it swelling. Yes, sir; swelling. Oh! don't you go and be after turning up your nose and whistling in that derisive sort of way: you stick to the everlasting oil-cake as bad as the worst of them, I know; but you may depend upon it that the oil-cake reign will not last for ever. Farmers will soon begin to find out that it is not just such capital stuff as they have been fancying. How much of what you buy do you think is really oil-cake? If you have three-quarters you are very lucky. It is in itself very nutritious feeding, and well adapted for stock; but its price is greater than its value, of which I think you will be convinced, if you only remember that it is linseed with the oil expressed, and that you can grow your own for the same, if not at a less cost per ton, than you can buy oil-cake.

What induces me to write so much about it is a song that was sung the other evening at our club—not a very capital one, to be sure; but certainly the subject is new, and as it may amuse you, I will write it as I remember it.

Have you heard what a terrible row 's in the land?
Have you heard what the farmers have taken in hand—
How they're going without any pity to take
And all their fat cattle blow out with oil-cake?

There's one says he thinks, another he don't;
A third, he could prove it down-right—but he wont—
That, take what you will, there's nothing can make
The cattle to fatten so well as oil-cake.

Oh! go to the market, or go to the fair,
At dinner some jolly young farmer will swear
That nothing (and thumps till he makes the house shake)
Can fatten like *plenty of roots and oilcake.*

Hurrah! then for farming! Hurrah! then for stock!
Another hurrah! for each jolly old cock,
Who won't grow his linseed, but rather take
And spend a round sum on half-*dirt* half-oilcake.

Something in the style of Homer that, sir—rather an improvement on "Moore's Melodies."

Speaking about Moore—what a great deal of work is made at present about reclaiming moors and waste lands! Would it not be better to endeavour to improve that land which is already in cultivation? There are millions of acres in England only capable of producing a very moderate crop, which, if they were drained, would grow a really good one. Such land, in its wet, cold state, effectually cures the greater part of the seed which is sown in it for growing; cures it with something in the same manner in which ham or bacon is cured—speedily to disappear.

I dare say you are heartily tired of this lengthy epistle, yet I am not quite such a hand at long letters as Ben Buckleshoe, who wrote one so long to Lord Lovel upon "The Confines of Latitude and Longitude," that his lordship had to get his spy-glass to see the end of it; and in his lordship's report on it, he says that, "though Mr. Buckleshoe has endeavoured to prove in his epistle that latitude and longitude have confines, he clearly disannuls it by that epistle, which is of itself entirely without anything of the kind." So much for Ben Buckleshoe and Lord Lovel: now a word for myself. It is this: I am proud to remain,

Yours very truly, POOR PRICE.

P.S. If you do not receive this to-morrow, do not wait for it, but write me immediately; as I long to hear how yourself and family are.

TENANTS' RIGHTS—A RAILWAY COMPENSATION CASE EXTRAORDINARY.

TO THE EDITOR OF THE MARK LANE EXPRESS.

Sir,—In your paper of the 15th of November last is a report of a railway compensation case—"John Lowe *v.* the East and West India Docks and Birmingham Junction Railway Company." The particulars of the evidence were given; but the learned magistrate did not then decide the case. He has since made his award, at the sum of £440 and costs—viz., for loss of profit on 1A. 1R. 10P. of land required for the site of the railway for two years, £30; for severance, £60; for sheds, £200; and for general damage, £150. It will be seen, on referring to the report in your paper, that these sums are the same as were estimated by Messrs. W. Wallen, W. H. Dean, and myself, except as to the sheds, which we valued at £40 more than is allowed. The award is wholly silent as to Mr. Lowe's loss of profit on the lairs and food for the cattle and sheep imported, owing, as I imagine, to the want of sufficient proof of the numbers housed and fed on the premises. Be that as it may, the loss will be severely felt by Mr. Lowe, who must incur serious expenses in providing suitable accommodation elsewhere, unless he shall risk the chance of fire from the engines, and if damage arise, call upon the Railway Company to make good his loss. The railway company had offered £25 to Mr. Lowe, in full satisfaction of his claim.

The "*extraordinary*" case alluded to, and to which I claim the attention of your readers, occurred at *Staines* yesterday, rendered extraordinary from the circumstance that, in almost every particular, except as to the profit on the lairs and food, this and Mr. Lowe's case were nearly the same. The case in question was the claim of Mr. William Dearle, cattle dealer, farmer, and tradesman, carrying on business in Staines, against the Windsor, Staines, and South Western Railway Company, for loss of profit on 1A. 2R. 12P. of meadow land for two years, required for the site of the railway, and for severance of eight acres of the same land—for deprivation of water—for general loss and inconvenience, and compensation for a compulsory sale. Mr. Dearle and his family have, it appeared, long resided on this their freehold estate, consisting of a dwelling-house, shop, warehouses, and farm-buildings, situate at the junction of the Richmond, Hampton Court, and Chertsey Roads with the Great Western Road, in the town of Staines; that he has for several years carried on the business of cattle-dealer and salesman, particularly in the purchase and sale of milch cows to the neighbouring gentry, and fat cattle to the butchers of the town and elsewhere; that his sheds for cattle, farm-yards, and buildings, are of a superior description; that he rents, as tenant from year to year, and has done so for several years, three closes of rich meadow land, adjoining to his said farm-yard and buildings—together 11 acres; that the nearest meadow to the said buildings is about three acres, between which and the other meadows is a brook of water; that the railway company requires 1A. 2R. 12P. of the said meadow for the site of the railway, leaving about 1½ acres east of and between the railway and the said farm-buildings; that the railway in this meadow will be upon an embankment 14 feet high at the least; that the two meadows of eight acres will be on the west side of the said embankment; that at present there is a direct communication between the farm-buildings and the three paddocks, by means of a bridge over the brook; that, when the railway has been formed, the only road to the two meadows of eight acres from the farm-yard will be along the Richmond and Great Western Roads, through a portion of the town of Staines, then down a narrow lane into the two closes—together nearly 500 yards in length. It is, then, obvious that the height of the embankment will cut off all supervision of the cattle, labourers, &c., in the two closes, from Mr. Dearle's dwelling-house and premises, from which now every portion of the land can be seen; that the railway will cut off all access of cattle to the brook from the 1½ acres which will be left of the three-acre meadow; that the continually driving of the cattle to and from the two meadows, along the public roads through the town, will occasion an increase of labour and an increase of risk—of damage to the cattle, especially of strange cattle, of which from 200 to 500 head are purchased and sold by Mr. Dearle in the course of the year; and, therefore, that the railway must necessarily derange Mr. Dearle's business, and will entitle him to large compensation at the hands of the railway company.

In August last the company gave notice to Mr. Dearle that they required 1 A. 2 R. 12 P. of his land for the site of the railway; in October they gave him notice that under the "Land Clauses Consolidation Act, 1845," two magistrates would be appointed to assess the compensation to be made to him. On Monday last two magistrates, Mr. Rowe and Mr. Marriott, gave him notice that they would meet at the Bush and Clarence Tavern, in Staines, to hear his case and adjudicate upon it. The magistrates attended accordingly with their clerk, who is also agent for the railway company. The magistrate, with the company's surveyor and myself, proceeded to view the premises. Mr. Sanderson, Mr. Dearle's surveyor, delivered in Mr. Dearle's claim as follows:—

	£	s.	d.
For loss of profit for two years ending Lady-day, 1849, on 1 A. 2 R. 12 P. of land required for the site of the railway	25	7	6
Half-dressing on ditto	4	11	6
Cost of making a pond or sinking a well with pump on the 1½ acres, severed by the railway from the brook	12	10	0
Extra labour driving cattle by the turnpike roads			

from and to the yard, and the two closes, to Lady-day, 1849	12	0	0
Loss from being deprived of ready access to the sheds for the same period	5	0	0
Cost of bridge over the brook, rendered useless by the railway	10	0	0
Probable loss upon stock from being driven along the public roads for the same period	5	0	0
For severance and a forced sale	20	0	0
	£92	12	0

Mr. Sanderson verified his estimate, which I confirmed, and added that I was of opinion that double the amount would be nearer the mark. Mr. Dearle proved his extensive dealings in cattle, and the great loss that the railway would occasion to him in his business.

Mr. Buckland, the company's surveyor, was then heard on behalf of the company. He estimated the loss and inconvenience that Mr. Dearle would be put to at £25.

The magistrates asked Mr. Sanderson what his charge would be. He said £15 15s.; and for mine I said £5 5s.

The parties were ordered to withdraw. The magistrates then consulted together, after which the parties were called in, when the magistrates announced their decision to be £31 in full satisfaction of Mr. Dearle's claims, and two guineas extra costs for surveyors.

Observations.

No two cases were ever more alike than those of Mr. Lowe and Mr. Dearle as regards the item upon which the magistrates have decided; in the one case £240 and costs were awarded, in the other £31 and two guineas costs. Comment is unnecessary.

The landlords in parliament have taken good care that none of their claims above £50 shall be submitted to magistrates for decision; their yearly tenants, no matter the amount of damage they may receive from railways, are handed over to magistrates. The railway companies can select such of the magistrates as they please within the district to assess compensation; and the wisdom of railway companies has taught them the advantage of appointing the magistrate's clerks to be their local agents. Mind, I do not find fault with the magistrates for what they have done in this case; I have no doubt they acted to the best of their judgment; but I do find fault with the Legislature for throwing upon country gentlemen a task which can alone be properly performed by gentlemen of great experience in the law; and, therefore, that barristers of some standing ought to be employed, and who ought to be paid a proper remuneration for their services. Jas. Dean.

Tottenham, Dec. 17, 1847.

FRESH *v.* DECAYED MANURE.—M. Koerte, professor at the Royal Academy of Agriculture, at Mœglin, in Prussia, made, some years ago, a series of experiments to ascertain whether it is more economical to use fresh or decayed manure, regard being had to the relative proportion of each. I subjoin the principal results of his experiments. 1. Manure exposed to the influence of the atmosphere, in heaps or layers, continually loses its fertilizing principles, and its bulk diminishes in a corresponding proportion. A hundred loads of fresh dung are reduced at the end of 81 days to 73.3 of its first bulk, or loss of 26.7; 254 days, to 64.4 of its first bulk, or loss of 35.7; 384 days, to 62.5 of its first bulk, or loss of 37.5; 493 days, to 47.2 of its first bulk, or loss of 52.8. 2. The loss was much more considerable in a certain time, at the commencement of its decay, than at after periods of this change, as Gazzeri had previously ascertained. 3. Less loss is sustained when manure is spread in layers on the land, and well pressed, than when in small heaps; so that it is advantageous to spread it in layers on the land, and roll it, when it cannot be immediately ploughed into the soil. 4. Although it is impossible to state exactly the loss of bulk of manure when allowed to lie for a long time in the heap, we shall not be far wrong in stating that in common circumstances it is at least one-fourth of the whole; so that 100 cart-loads are reduced to 75. M. Koerte concludes from his investigations, both on a small and large scale, that it is more advantageous to carry the manure at once, in its fresh state, to the land (and this is more particularly the case with sheep dung), than to wait until it has decayed; and this rule should be invariably followed, taking at the same time into consideration the nature of the land.—Pharmaceutical Times.

The Rev. E. Sidney, rector of Cornard Parva, near Sudbury, lately delivered a very able and interesting lecture upon Agricultural Chemistry to the tenants and friends of Sir John Boileau, at Ketteringham Hall, Norfolk. In the course of his address the rev. gentleman gave the following valuable recipe for testing the genuineness of guano:—

"Take a given weight and dry it on the hob on letter paper, at the heat of 212 deg. Farh; when it appears dry weigh it; the loss will be water, deducting from ½ to 1 per cent. for the passing off of ammonia. Take the dried sample, and incinerate it in a porcelain crucible. In good guano the ash will soon appear white on the application of red heat; then weigh it again, and the loss is organic matter and salts of ammonia. Wash the residue with muriatic acid and hot water, until nothing remains but the impurities—sand, clay, &c. In *good* guano these will not exceed 2 per cent., and rarely amount to 1 per cent. If the guano appears mixed with saw-dust, simple washing will be sufficient for its detection."

At the close of the lecture, Sir John Boileau, in presenting the thanks of the meeting to Mr. Sidney, observed—"Let me then, my dear sir, offer to you, on all our parts, our most cordial thanks; but for myself I cannot find words to express my particular obligation, for it is at my request you have come amongst us. Long may you be spared to go about, as you have never failed, like your great Master, doing good; and may we often hereafter have the happiness of seeing you amongst us."

METEOROLOGICAL DIARY.

Day.	Barometer. 9 a. m. in. cts.	Barometer. 9 p.m. in. cts.	Thermometer. Min.	Thermometer. Max.	Thermometer. 9 p.m.	Wind and State. Direction.	Wind and State. Force.	Atmosphere. 8 a. m.	Atmosphere. 2 p. m.	Atmosphere. 9 p.m
Nov. 21	29.95	29.65	38	42	40	South by E.	calm	cloudy	cloudy	cloudy
22	29.66	29.72	42	48	46	W., S. W.	variable	fine	sun	cloudy
23	29.70	30.—	47	54	42	S.W.,W.by N	brisk,ca.	cloudy	cloudy	fine
24	30.10	30.16	40	52	47	S. West	lively	fine	sun	fine
25	30.16	30.—	47	54	50	S. West	brisk	cloudy	cloudy	cloudy
26	29.94	29.65	46	54	42	S. W.--North	variable	cloudy	cloudy	cloudy
27	29.33	29.27	40	46	48	N.E.—South	gentle	cloudy	cloudy	cloudy
28	29.19	29.23	42	48	43	S. West	brisk	cloudy	cloudy	cloudy
29	29.41	29.80	37	48	38	Westerly	gentle	fine	sun	fine
30	29.80	29.88	37	45	53	Westerly	lively	cloudy	cloudy	fine
Dec. 1	30.25	30.29	45	54	40	WbyN,WbyS	gentle	fine	sun	fine
2	30.38	30.27	37	53	52	W., S. by W.	gentle	fine	cloudy	cloudy
3	30.20	30.10	52	52	54	South West	gentle	cloudy	cloudy	cloudy
4	30.02	29.70	45	55	47	South West	brisk	fine	sun	cloudy
5	29.38	29.55	40	50	38	N. West	brisk	fine	cloudy	fine
6	29.—	28.83	30	50	43	W. by North	strong	cloudy	cloudy	fine
7	28.76	29.26	37	53	38	North by W.	strong	cloudy	cloudy	cloudy
8	29.60	29.80	32	45	38	N. W., W.	gentle	fine	sun	cloudy
9	29.60	29.80	36	45	53	South West	strong	cloudy	cloudy	cloudy
10	29.82	29.87	51	54	52	South West	strong	cloudy	cloudy	fine
11	29.84	29.94	46	54	43	South West	gentle	cloudy	sun	fine
12	30.—	30.09	40	53	45	South West	gentle	fine	sun	fine
13	30.10	30.12	41	50	42	S. S. W.	gentle	fine	sun	fine
14	30.12	30.13	41	53	43	S. S. E.	gentle	cloudy	fine	fine
15	30.13	30.10	42	48	47	S. S. W.	variable	fine	sun	cloudy
16	30.10	30.05	46	51	47	South	gentle	cloudy	sun	fine
17	29.88	29.81	46	51	42	South	brisk	cloudy	cloudy	cloudy
18	29.65	29.49	46	49	42	S.byW.byE.	brisk	cloudy	cloudy	cloudy
19	29.50	29.60	38	44	42	S. by East	gentle	fine	fine	fine
20	29.74	29.76	37	43	36	North	gentle	cloudy	cloudy	cloudy
21	29.70	29.69	32	34	33	N.N.W.	gentle	cloudy	cloudy	cloudy

ESTIMATED AVERAGES OF DECEMBER.

Barometer. High.	Barometer. Low.	Thermometer. High.	Thermometer. Low.	Thermometer. Mean.
30.32	29.12	55	17	39.0

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
43.0	41.16	42.085

Weather and Phenomena.

(Rain is indicated by the letter R.)

Nov. 21: R.; changeable; shower; wind at night. 22: R.; cloudy; gleams; evening shower, with wind. 23: R.; wet till evening. 24: Clear, fresh, warm. 25: R. (a hint); gloomy. 26: R., quite wet. 27: Rainy. 28: Broken, fine clouds; a distant, faint rainbow. 29: Fine and bracing. 30: Heavy clouds, broken and passing off.

Lunations.—Full moon, 22nd, 10h. 4m. morn. Last quarter, 29th, 4 h. 22 m. afternoon.

Dec. 1: Beautiful. 2: Damp; changeable. 3: R. (a little); heavy clouds all day. 4: Fine and drying. 5: Beautiful drying day. 6: R., in quantity, early. 7: Rain and wind; finer evening. 8: R.; a fine frosty morning; ice on water. 9: R. in evening, after a cloudy day. 10: R., small drizzle all day; finer evening. 11: Improving; broken, cloudy masses, and gleams. 12: Fine. 13: Fine; stratus, driving, with wind at night. 14: Fine and placid. 15: R.; fine till 2 o'clock; cloudy; wind and rain. 16: R.; small rain early, then much finer. 17: R.; generally wet. 18: Rainy day. 19: Overcast, but drying. 20: R.; cold, northern change; rainy evening. 21: Frost air; vaporous atmosphere; chilly.

Lunations.—New moon, 7th, 8h. 31 m. night. First quarter, 15th, 3h. 26m. morning.

Remarks referring to Agriculture.—The general high and remarkably equal temperature, by night and day, has kept every plant in full verdure; but the corn with us is in no degree gay. Wheat, however sown, is healthy, rather thin, and of humble growth. Turnips here are poor in the fields; but turnip-cabbage is very fine. Clover, on the poorer and chalky soils, is not promising. Rye after wheat healthy and full. Frost began to threaten on the 21st, but to Christmas Eve it never hardened the ground. No talk of disease among cattle or sheep hereabout; and pork meat is superior.

J. Towers.

Croydon, Oct. 24.

CALENDAR OF HORTICULTURE.—JANUARY.

I refrain from the usual retrospect till the close of the article, in order to make the report for the last month of the year as comprehensive as possible.—J. T.

Operations in the Vegetable Department.

Who can foresee what ought to be done, when every by-gone prognostic, and all existing phenomena, yet concur to foretell a dripping season? So great and enduring had been the drought, and so doubtful the autumnal equinox, that as soon as the rains and stormy south-west winds of October set in, conjoined with the meteoric fact that every slight approach of hoar-frost was immediately followed by an extremely warm and moist atmosphere and repeated showers, it became more than probable that a mild and open winter would be the result. The ground was already well supplied with water, when the steadfast rains of the 17th and 18th of December added to its quantity; and thus it is likely that the new year will come in wet and warm. However, every operation out of doors must be contingent; therefore, if the ground be wet, let it not be moved by any tool, and in gathering or cutting vegetables for the table, let a long board be laid down to walk upon, since it is not advisable to press swampy soil into holes, which will hold water, and prevent its descent. If severe frost occur, a great deal may be done by interposing any long litter between rows or single plants. Thus last year we secured a stock of lettuces—some even of tender French varieties—by simply laying fronds of dry fern between the plants. If the weather prove dry and open, and the ground become free, good will be done by hoeing, or rather, by stirring the surface between rows with a light three-prong fork, to the depth of four inches: thus young cabbage plants, winter spinage, endive, &c. &c., will be kept clean, and the ground neat; but after such disturbance, the surface must not be trodden, and therefore the board will in such cases be the more required. It is astonishing how slight a covering can protect, provide the material lie loose and somewhat above the vegetable; yet *framing* is much to be preferred for the raising and protection of *radishes* (some of which should be early sown). *Lettuces, mustard and cress, cauliflowers, young cabbage, endive, &c.*, are most safe in frames; and as to early peas, every advantage is thereby secured—economy of seed, time, and rapid growth.

Early Potatoes.—In "the *Calendar*," page 840, of the Gardener's Chronicle, Dec. 18, were some pertinent remarks which will convey much instruction. I can by experience testify their general accuracy, because I received from a friend, some years since, a small supply of the genuine Lancashire lemon kidney—a potato which comes in, in May, by the 15th, continues fine all the summer, and when finally digged in October, has (even in Berkshire, where the soil is very dissimilar) carried off a first prize for every discernible quality. "Lancashire" says the article alluded to, "has long been noted for very early potatoes, which find their way into the Liverpool and Manchester markets at a period so early as would astonish folks at the southern part of this island, who have a much superior climate to deal with. The cottagers for the most part keep their *seed potatoes* in upper rooms, frequently spread beneath their beds, about three or four inches in thickness; fermentation being studiously avoided. The potatoes in this situation begin to sprout in December; and in the course of January many of them are planted, great care being taken *not to* rub off or *injure* the sprouts. When the potatoes are breaking ground, they are covered, as the market gardeners cover their early radishes, with a soft, light kind of grass, which grows in the neighbourhood, and which is cut and dried for the purpose; and is taken off only in fine days, and replaced again in due time when the soil is warm."

More is said, which I can supply by means of the directions given with the tubers that I received.

The utmost care is observed to dry and mellow the tubers, before they are stored: they are then prevented by dry cold from sprouting at all; while at the same time frost is absolutely excluded; no damp ever approaches while torpor is maintained; but in December, or in the earliest days of January, the tubers are laid on the floor of a greenhouse, a gentle warm pit, or cellar, where there is a temperature of about 50 degrees: there the leading eyes germinate, and when the shoots become an inch or two long, active and strong, but not brittle, the potatoes (entire) are transferred to a warm sloping bank of light mellow earth, exposed to the sun. They should be planted in rows, at least six inches deep, and at a similar distance apart; in other respects as is customary with the ash-leaved kidneys, which, however, are always distanced by those of Lancashire. Great care is required to

protect the surface by deep litter during severe early frost, and by earthing up, and dry grass, fern, &c., laid about the plants when above ground. The Gardener's Chronicle has another paragraph worthy of our notice, as it implies economy of ground—it says, "A good bed of *radishes* should be sown directly *on a warm slope*. *Potatoes* may occupy the bed as principles; the radishes may be removal in due time without injury to the potatoes, especially if sown in drills." The first week of the new year will not be too late, and it is a fine thing to obtain a good supply of early tubers, from the middle of May to that of July. It would be well worth while to make a friend of some Lancashire party, and thus to obtain the true varieties for earliest table use, following them up with the "frame," and genuine "ash-leaved." Soot and salt are the safest manures, recollecting that the latter must not *touch the tuber*.

Fruit Department.

Pruning.—Writers of calendars generally advise to go on with this operation, in reference to *all* trees and the berry-bearing shrubs. If you speak on the subject to practical gardeners in large establishments, they say—"We are obliged to embrace favourable opportunities; for such is at times the pressure of business, that, were we to defer an operation that may require a month, everything would have to be done at once." This is the gist of the affair. Philosophy says—"Do not inflict wounds at a time when there is no active, healing principle at work." The amateur who perhaps has six to a dozen peach-trees on his walls, and as many apricots, plums, and superior cherries, ought to watch, and wait for the swelling of the buds; and then to prune. The same theory applies to espalier and low dwarf trees of every kind, and also to raspberry, gooseberry, and currant bushes.

The *vine* is the only tree which we say must be pruned ere the sap move; but this ought not now to require attention. *Fig-trees* should be covered immediately in *dry* weather, if they have been so long overlooked. Spare, long sashes, placed sloping against the wall, fastened to prevent a fall, are capital defences, and should be matted in severe weather.

Forcing Departments.

The *early vinery* begins to be active, and its temperature should be raised gradually, as a maximum by day, from 60 deg. to 65 deg. and 70 deg., and be kept at night from 55 deg. to 60 deg., as the days advance. The gardener should be aware that the mornings do not begin to lengthen till the middle of the first week, because the sun does not rise more early, even by one minute, till then; whereas he has set later, and consequently the evenings have become longer, ever since the 27th of December; hence, no advantage has been gained in the mornings. After the 7th inst. the day temperature may be urged on at the rate of a degree daily, till it attain its maximum without sun; subject to the rule that, when the grapes come into flower, it should be 70 deg. at the least, to promote the setting of the berry; when also syringing should be abandoned. *Pine-apples* require care, the law is—admit of no check, keep growth in activity, and bring the *fruiting house* to a state of active heat—70 deg. to 75 deg.

Ornamental Grounds.

Nothing requires to be done but those labours which effect and maintain neatness and order. *Snow* must never be permitted to remain upon evergreens; for the power of the sun is, in such cases, very destructive.

Retrospect.—We have now arrived at the shortest day—the real *midwinter* of the cultivator, whether of field or garden. There is now less solar-light than at any other period or day of the year; yet the sun will rise later for some days to come. On this day we have the first indication of winter frost; for, though the thermometers with me mark only 32 deg., and we have seen that on two occasions they have marked 28 deg. (4 deg. of frost)—yet it then was coincidently with a white rime on the herbage, which was speedily followed by rain. Now the wind is north, the day gloomy, and the ground black. Full moon will also occur at 10 p. m. of this 21st evening. The 20th was chillingly cold, and it rained in the evening. Till then, vegetables remained in most excellent condition; cabbages, in vast breadths upon our market gardens, were as finely hearted as in June; others hearting rapidly; *greens* rich and beautiful, *broccoli* clean and solid, *celery* pure—not hollow and pipy; *winter spinach* and endive of first quality, the former yielding ample gatherings; *potatoes* not quite perfect, but giving assurance of being convalescent. If winter now set in, everything will of course be arrested in its progress, and the gardener's judgment and assiduity be called into conscientious exertion. We hope the best for the poor; they are lamentably numerous, but the supply is ample. Yet the call to bring every *waste* and available spot under spade cultivation is imperative; thousands of acres stand worse than idle—the fertile propagators of weeds and rubbish; our rail lines are also a disgrace, in these respects, and also for their mud holes, the recipients of filthy water. How great are our means of improvement and alleviation! shall we neglect them?

J. Towers.

Croydon, Dec. 21.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR DECEMBER.

For the time of year, the weather, during the greater portion of the past month, has been extremely mild and vegetative. In all parts of England, as well indeed as throughout the United Kingdom, somewhat large quantities of rain fell in its early part, and which caused apprehensions to be awakened as to the future fate of the winter wheats, which in some localities were looking unhealthy, from the absence of frost to check their growth. Fortunately, however, the atmosphere became more seasonable about the 20th, and has continued so up to the period we are now writing: hence, the condition of the wheat plants, generally speaking, has become much improved. Although the prices obtained during the last two months have been by no means high, we have every reason to know that the breadth of land under wheat culture, this season, is nearly or quite equal to that of last. This, in our opinion, is a very satisfactory state of affairs, as it is quite evident that average crops of all kinds of the soil's production conduce more than any other circumstance to a steadiness in value, and the ultimate benefit of the agricultural interest. Compared with some former seasons, only a moderate quantity of wheat of the present year's growth has been thrashed out; yet, as the supply of last season at the close of harvest was unusually small, it is quite evident that the actual quantities of that grain at this time on hand is not in excess of the future demand. Those on offer in our various markets have been on a moderate scale, and greatly out of condition; hence, the finest qualities of both red and white have commanded a firm, though not to say brisk, demand, at a steady rise in the quotations. The middling and inferior kinds have moved off steadily, at improved currencies. The same observations may be equally applied to flour; but all spring corn has ruled heavy, on somewhat easier terms, if we except the best parcels of malting barley, which have realized more money. So far as our judgment carries us, there is, we conceive, looking to all the circumstances connected with supply and demand, every prospect of a steady sale for wheat and flour during the next three months.

We regret to state that several very unfavourable reports have reached us respecting this year's crop of potatoes. It is admitted that the actual quantity produced has not been equal to our wants; and many farmers have informed us that, on opening their pits, they have found large quantities in a rotten state—consequently unfit for consumption. The markets have been sparingly supplied with sound qualities, some of which have produced as much as 140s. per ton; but rather large quantities of inferior ones have been forwarded, and which have found buyers at improved quotations.

The turnip fallows have turned up very well, and not a few farmers have progressed with the spirit of the times, in subsoiling to a considerable extent. The supply of turnips, swedes, and other pabulum is seasonably large, and, as far as we can ascertain, of excellent quality. Still, however, the demand for linseed, as well as cake, for feeding purposes, has been very extensive: consequently, the prices of those articles are well supported.

As to food, the stock has fared remarkably well; but the extreme dampness of the weather has been somewhat prejudicial to it, and several severe losses have been again sustained by our graziers and flock-masters.

Our advices from Scotland are to the effect that the winter grain has been sown under the most favourable auspices. The different markets have been but moderately supplied; yet, as some large parcels of inferior foreign wheats and flour have been pressed for sale, the general demand has been by no means active, although a trifle more money has been paid for old wheat and the best new oats. The shipments of potatoes to the English markets have been very small; nor is it likely that they will increase, from the want of large stocks.

From Ireland the accounts are by no means flattering. In most parts of the island a great scarcity of food is complained of. The markets have been but moderately supplied with most articles of corn; while the general demand may be considered steady at full prices. As yet, the quantities of oats forwarded to England have been very small.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

As is almost invariably the case at this particular season of the year, a great degree of interest has been observed on the part of both the graziers and the community at large, respecting the quality and condition of the stock brought together for competition at our numerous cattle shows, as well as

the state of the supplies exhibited in the various markets. In the month just concluded, those on offer in Smithfield and elsewhere have not equalled, in point of *general* quality, the exhibitions of some previous corresponding periods: nevertheless, a large portion of the beasts and sheep has come to hand in first-rate condition. The show-yard in Baker-street has been by no means heavily supplied, either as respects number or quality; but we attribute the falling off as much to the causes to which we alluded in our last month's *Review* as to any other circumstance.

The comparative scarcity of really prime beasts, and which we have had to notice for some months past, has produced considerable activity in the demand, and with it extremely high prices. On the great day, in Smithfield, some of the best Scots sold as high as 5s. 10d. per 8 lbs.—the highest figure we have ever quoted—while the value of all other kinds of meat ruled very high. The number of beasts sold to the country butchers has been large; and some little difficulty has been experienced by some of those in London in providing themselves with adequate supplies in first-rate condition.

The following is a statement of the numbers shown since our last:—

	Head.
Beasts	18,978
Cows	500
Sheep	101,720
Calves	1,240
Pigs	2,765

COMPARISON OF SUPPLIES.

	Dec. 1843.	Dec. 1844.
Beasts	13,290	13,290
Sheep	110,362	113,290
Calves	980	964
Pigs	1,260	1,340

	Dec. 1845.	Dec. 1846.
Beasts	17,712	19,639
Sheep	98,660	108,410
Calves	862	1,095
Pigs	2,671	2,150

The past month's quotations have ruled as under:—

Per 8lbs. to sink the offals.

	s. d.	s. d.
Beef, from	3 6 to	5 10
Mutton	3 8 ..	5 4
Veal	3 8 ..	4 10
Pork	3 6 ..	5 2

COMPARISON OF PRICES.

	Dec. 1843.		Dec. 1844.	
	s. d.	s. d.	s. d.	s. d.
Beef, from	2 6 to	4 6 ..	2 8 to	4 6
Mutton	2 10	4 8 ..	2 10	4 4
Veal	3 0	4 8 ..	3 0	4 4
Pork	2 8	4 4 ..	2 10	4 0

	Dec. 1845.		Dec. 1846.	
	s. d.	s. d.	s. d.	s. d.
Beef, from	2 10 to	4 8 ..	2 10 to	4 6
Mutton	3 4	5 10 ..	3 8	5 2
Veal	4 0	5 2 ..	3 8	4 8
Pork	3 6	5 2 ..	3 6	4 10

The bullock droves have been thus derived:—

	Head.
Northern districts	6,850
Eastern ditto	800
Midland and western ditto	4,200
Other parts of England	3,400
Scotland	780

IMPORTS OF FOREIGN STOCK.

We have, unquestionably, arrived at a most important era, in respect to the importations of foreign stock for consumption here, especially when it is considered that as yet they have not had any depressing influence upon the value of either home fed beasts or sheep, taking that of several preceding years as our guide. A correspondent has sent us a series of questions on this all-important subject, and to which we have very great pleasure in replying. In the first place, he inquires "What are the different countries from which stock is exported?" to which we reply, from Germany, Holland, and Spain; but chiefly from the two former. The largest number is shipped from Rotterdam and Harlingen. With regard to the inquiries respecting value, we may observe that the difference between that of the foreign and the English breeds of beasts is quite 8d. per 8 lbs.; of the sheep 1s. per 8 lbs. A few prime beasts, imported from Holstein, *viâ* Hambro', have sold at relatively high rates; but the imports of really good animals are now so rare that the estimate we have given must be very near the mark. Such has been the miserable condition in which many of the sheep have come to hand that some thousands of them have not produced more than from 9d. to 10d. per 8 lbs. The average dead weight of the beasts may be set down at 65 stones; of the sheep, 7½ stones. When we take into consideration the expenses of transit, &c., it is quite evident that many of the shippers must have sustained very severe losses during the present year. This must account for the falling off in the importations. As we have observed on some former occasions, the metropolitan market will never prove a profitable one to the importers of stock, unless a great improvement take place in the quality and condition of both beasts and sheep. The imports into London, since our last, have been as follow:—

	Head.
Beasts	1,969
Sheep	8,582
Lambs	71
Calves	406
Total for London	£11,028

At the outports 3,120 head of each kind of stock have been landed, chiefly from Hambro' and Rotterdam, making a total importation for England of 14,148 head, against 14,821 ditto at the corresponding period in 1846.

Newgate and Leadenhall markets have been very heavily supplied with meat; yet the general demand has ruled active, at very high prices. Beef has sold at from 3s. 6d. to 5s. 2d.; mutton, 3s. 8d. to 4s. 10d.; veal, 3s. 8d. to 4s. 8d.; and pork, 3s. 10d. to 5s. 2d. per 8lbs. by the carcass.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF DECEMBER.

Though the year now about to terminate has been one of severe trial to all classes, the agriculturists, as a body, have perhaps suffered less than other members of the community; for, though the harvest of 1846 was very deficient, those parties who were enabled to hold their corn until the summer of 1847 obtained such high prices for their produce as in some measure to compensate for the deficiency in quantity. We fear, however, that a large number of farmers, whose means were not sufficiently ample to allow them to wait for a favourable time for realizing, must have suffered greatly in a pecuniary point from the short yield, particularly in regard to spring corn and potatoes; and where one grower has been benefited by the high range of prices of food, a dozen have probably suffered with the rest of the community. We sincerely hope that the new year now about to commence may prove more prosperous; and, taking all things into consideration, we are inclined to look to the future with confidence. That the last crop of corn has yielded a good, if not a large, return, is admitted on all hands; and though prices have not been high, they have been more remunerating than, with free trade in corn, might have been expected: fine wheat has lately been selling at 56s. to 58s., and even 60s. per qr.; barley firm, 30s. to 34s.; oats, 20s. to 25s.; and beans and peas have commanded high rates. These prices appear likely for a time to be maintained; and as at this season of the year comparatively little foreign grain can reach us, and the corn laws, which were suspended for twelve months, will again be in force on the 1st of March next (up to which period most of the northern ports of Europe are likely to be closed by ice), an opportunity may be afforded to the British grower to dispose of a part of his produce at remunerating prices. Many well-informed parties incline to the opinion that the extensive failure of the potato crop may cause so great a consumption of bread as to occasion a material rise in the value of wheat; and there is certainly some ground for this belief.

The breadth of potatoes planted was much less than in ordinary seasons; the early sorts escaped the disease, and yielded tolerably well; and even the late varieties appeared tolerably sound when dug, but it has since been discovered that they do not keep in the pits; and we have lately heard of numerous instances where, upon opening the same, the owners have discovered nearly the whole in a state of decomposition. The price of this article has, within the last month or two, risen rapidly in all parts of the kingdom; and so dear and scarce have potatoes become in the neighbourhood of the metropolis, as to be beyond the reach of the poorer classes, who are compelled to have recourse to substitutes. This will, without doubt, have a material effect on the value of all other sorts of food, but more particularly on the price of bread: indeed, we are inclined to attribute the recent rise in wheat mainly to the extra consumption of bread caused by that article being taken instead of potatoes. It must, however, be remembered that we are now in a very different position to what we were at this time last year, and that it would therefore be unwise to draw conclusions from the effects which were then caused by the potato failure. Our own crops of all kinds of grain have yielded largely, and the corn harvest of 1847 may be said to have been productive all over the world. The value of money was then very low, speculation rampant, mercantile credit stood high, and investments in corn were looked upon as sure to pay a large profit. Prices were therefore driven up above the point warranted by the actual position of affairs, and wide-spread ruin followed, from the effects of which it will be long before the trade recovers. We are consequently disposed to think that no great rise on present rates is likely to occur; nor do we deem that any material rise would be an advantage even to the farmer, as it would be sure to draw large supplies to this country from all quarters.

The character of the winter has, up to the present time, been unusually mild, and the wheat plant is generally looking well in all parts of the kingdom — indeed, somewhat too luxuriant for the period of the year; and severe frost, if not preceded

by a fall of snow, might do harm. The humid state of the atmosphere has acted very unfavourably on the condition of the wheat in stack, and the greater proportion of what has been brought forward for sale has shown the effects of the damp mild weather. This has been so far injurious to the grower, that it has lessened the intrinsic value of the commodity, and rendered its sale more difficult than it would have been if the condition had been better. There can be very little doubt that farmers have, owing to this cause, brought supplies forward sparingly, and until the week immediately preceding Christmas the deliveries were very short. We had then a few days of comparatively dry weather, and advantage was taken of the same to thrash out; there was consequently a marked increase the succeeding week in the supplies, and buyers being (as is usually the case at the close of the year) unwilling to enter into fresh engagements, the trade finished somewhat languidly towards the end of the month.

To afford a more clear notion of the fluctuations which have occurred in prices, we shall pursue our usual course, and give a detailed account of the operations in the various kinds of grain at Mark Lane, from the commencement to the last Monday in the month. During the first three weeks in December the arrivals of wheat coastwise into London were exceedingly small; subsequently some increase took place; but taking the total supply, it must be described as decidedly short. The quantity exhibited at Mark Lane by land-carriage samples from the neighbouring counties has also been less than is usually the case during this month, when farmers are generally free sellers, this being the time when the means have to be provided to meet Christmas rents and other expenses. We are, as we have already intimated, disposed to attribute the falling off in the receipts in a great measure to the unwillingness which has naturally been felt to thrash and bring wheat to market whilst the weather was unfavourable, and not to a desire on the part of farmers to hold back for higher rates. But to commence with our retrospect. On Monday, the 6th inst., the millers manifested a disposition to purchase, and though nearly the whole of the samples on the Essex, Kent, and Suffolk stands were in very indifferent condition, a clearance was made without giving way in prices; during the remainder of that week scarcely anything was brought forward for sale, and on the 13th the quantity was again short. Factors declined therefore to sell, except at enhanced rates, and they succeeded in obtaining an advance of 2s. on the best dry parcels, and fully 1s. per qr. on the common runs. This rise was not only maintained up to the 20th, but the upward movement continued, and on the last named day a further improvement of 1s. per qr. was realized, in the face of an increased show by land-carriage samples from Kent. During the Christmas week very little business was done, and on Monday, the 27th, no variation occurred in quotations; as was the case the preceding week, there was again a good show of Kentish wheat, whilst the display of samples on the Essex stands was scanty.

The arrivals of foreign wheat have been very moderate throughout the month, and rather large purchases having been made from time to time by country buyers, the stocks in granary have been diminished. There is, however, still a considerable quantity in the London warehouses, consisting principally of secondary and inferior sorts. The value of foreign wheat has scarcely undergone any change since our last; really fine qualities, such as high mixed Danzig and superior kinds of Lower Baltic red, have crept up 1s. to 2s. per qr., but the advance has not extended to the common descriptions.

London being nearly the only port in the United Kingdom where any quantity of good foreign wheat remains on hand, holders calculate with confidence on a continued inquiry, and the prevailing opinion is that the finer qualities will become more valuable.

During the first and second weeks in December there was a large sale for flour, but since the top price was advanced to 48s. per sack (which took place on the 13th) the demand has been less active. Hitherto, however, the millers have had sufficient to do in fulfilling the contracts previously entered into.

Comparatively little American flour has been received since our last, and really good brands have become very scarce; the best sorts have lately realized 28s. to 29s. at Mark Lane, and 30s. to 30s. 6d. per barrel at Liverpool. For doubtful and sour parcels irregular prices have been obtained, but the tendency has been decidedly upwards.

Until recently the supplies of home grown barley were very moderate, but within the last week or two the arrivals have increased materially. In the early part of the month prices gradually crept up, until as much as 35s. per qr. was obtained for superior malting samples. Augmented supplies and a falling off in the demand gave a heavy tone to the trade on the 20th, and on the following Monday prices receded all they had previously advanced, and the value of this grain is now very nearly the same as it was at the close of November. Very little foreign barley has come to hand, and several heavy grinding sorts have become scarce. The best descriptions, such as are usually received from the Baltic, have been inquired for, and have, in com-

parison with the inferior kinds from the Black Sea, brought high terms; the latter being worth only about 20s. to 21s., and the former from 25s. to 27s. per qr.

Malt has fluctuated in value 1s. to 2s. per qr.; but its price is not higher now than at the time we last addressed our readers, the rise obtained in the early part of the month having been subsequently lost.

The arrivals of British grown oats into London have been exceedingly small, nor had we any supplies of foreign of consequence until within this week or two. During the last fortnight about 30,000 qrs. have been received at this port from abroad, principally from the near continental ports. This supply may, however, be looked upon as the last we are likely to get until spring; and importers have therefore manifested very little anxiety to force sales. Notwithstanding the extreme insignificance of the home arrivals, the trade has remained in a very dull state. Cautiously, however, as the dealers have conducted their operations, sellers have declined to submit to any reduction, and prices have remained nearly stationary throughout the month. That the consumption of this grain has lately been less than used to be the case formerly is self-evident, the receipts having for weeks past, taking British and foreign-grown together, been considerably below the quantity considered necessary for the use of the metropolis, without causing any apparent want on the part of the dealers. We are inclined to think that Indian corn and other substitutes are being extensively used; still, we can hardly believe that the trade will remain in its present passive state much longer, if the supplies from Ireland do not increase.

The quantity of English beans brought forward at Mark Lane has been fully equal to the demand; and though prices have not been generally quoted lower, the tendency has been downward from week to week. At present, new ticks are not worth more than 35s. to 36s. per qr.; and other sorts are to be had at corresponding terms. Old beans have, owing to their scarcity, realized relatively high. prices. In Egyptians there has not been much doing beyond the usual retail demand for splitting, and quotations have undergone no change.

Prices of peas have also remained steady during the mild weather experienced in the first half of the month. White boilers were neglected; but on the 27th they excited more attention, and any slight decline which may previously have occurred was then recovered, the value of the article being much the same now as it was at the close of last month. In grey and maple peas there has been little passing, and prices may be quoted from 38s. to 42s. per qr. A parcel of foreign grey peas were sold lately at 36s. per qr., quality very good.

With the exception of a sale or two of Indian corn, to arrive, the vessels having orders to call at Falmouth or Cork for instructions as to ultimate destination, nothing of interest has transpired in the article. The free on board sales have been at about former rates; and the trifling business done in parcels, on the spot, has also been at previous prices.

Indian corn meal, of good quality, has been offered in quantity, at 15s. 6d. per barrel, and there has been some inclination to buy at 15s. per barrel, or a little under, with a view of holding over, in expectation of an increased demand.

Though there is not much probability of supplies of corn reaching us from abroad for some months to come, a short notice of the position of the trade at the different foreign ports may not be without its uses, as affording the means of forming an idea of the probable extent of the arrivals next spring.

By the latest accounts from the United States it appears that a considerable addition had taken place at several of the principal ports on the seaboard in the stocks of flour. The almost total cessation of exports, and a great increase in the receipts from the interior, with only a moderate local consumption, had caused the stocks in store to accumulate rapidly; and there can be no doubt that if our markets should hold out sufficient inducement, the Americans would speedily send some of their surplus growth across the Atlantic. This, however, is not the case at present. The highest price in London for American flour is 28s. to 29s., and at Liverpool barely 30s. 6d. per brl.: whilst at New York, Western Canal was, according to the most recent advices, worth $6\frac{1}{4}$ to $6\frac{3}{8}$ dollars per brl., being equal to 27s. to 28s., to which the expenses of shipping, freight, and insurance to Great Britain have to be added, rendering the cost here, without making any allowance for risk of voyage, somewhat above its present value with us.

That the yield of wheat and Indian corn all over the United States has proved very great, cannot be questioned; and the prices of both articles are likely, therefore, to give way during the winter months, unless holders are encouraged by favourable accounts from hence.

The weather was severe in America during part of November, but having subsequently become mild, the inland navigation, after having been partially closed by ice, had again been set free.

The receipts of bread-stuffs down the Erie Canal had been very large, and a considerable increase was shown as compared with previous seasons.

This will be at once perceived from the following return of quantities left at tide-water in

	1845. From 15th April to 30th Nov.		1846. From 16th April to 30th Nov.		1847. From 1st May to 30th Nov.
Flour (barrels)..	2,521,992	...	3,003,636	...	3,944,818
Wheat (bushels)	1,620,032	...	2,924,243	...	4,158,010
Indian Corn....	35,821	...	1,839,540	...	5,889,776

A very large increase had, it will be observed, taken place in the arrivals of each article; but that of Indian corn deserves the most attention, and convinces us that we shall each succeeding year receive larger supplies of that article from the other side of the Atlantic.

By the latest accounts from the north of Europe we learn that winter had set in sharply, and that many of the principal rivers and water-courses had been blocked up by ice.

At some of the Baltic ports efforts were being made to fill up and despatch the few vessels loading with grain whilst there was still a chance of the ships getting away; and it was the general belief that the season for shipments was over. Meanwhile, supplies of grain from the farmers had somewhat increased; but the accounts from this side being deemed encouraging, holders had declined giving way much.

At Danzig, on the 18th, the finest high-mixed wheat was still held at 51s. to 52s., and other sorts from about 43s. up to 48s. per qr. free on board, according to quality.

Comparatively little wheat had been received down the Vistula, and the deliveries from the neighbouring farmers had also been moderate: hence stocks on the spot were not large.

Letters from Stettin, of the 20th December, state that severe frost had set in there, which would, it was thought, put a stop to further shipments. Fine new wheat, weighing 61lbs. to 62lbs. per bush. was then quoted 44s. to 45s. per qr. free on board, but there had been no buyers at those rates.

The accounts from Rostock, Stralsund, and other ports are to the same effect; and the last advices from Hamburg inform us that the navigation of the river Elbe was no longer practicable, the ice having increased fast during the week. The price of wheat had slightly receded there, good parcels of Upland having been offered at 48s. to 50s. per qr. free on board, whilst there had been offers from Baltic ports at 44s. to 46s. per qr. These rates had been somewhat above the prices buyers had been disposed to pay; but if sellers had been willing to have accepted 1s. to 2s. per qr. less, a large business might have been done.

In the Dutch and Belgian markets prices have kept very steady, and the value of wheat is so nearly the same in those countries to what it is here, that there appears very little prospect either of arrivals from thence or shipments being made from this side.

In the southern countries of Europe the wheat harvest appears to have turned out less abundantly than was expected would have been the case at harvest time. Wheat is now higher at the leading Mediterranean ports than in the British markets; and without a material rise here, we cannot calculate on supplies from ports lying east of Gibraltar.

CURRENCY PER IMPERIAL MEASURE.

DECEMBER 27.

	Shillings per Quarter. NEW.		OLD.	
WHEAT, Essex and Kent, white	52	58	57	60
Ditto red	48	52	52	55
Norfolk and Suffolk	49	51	—	—
Lincolnshire and Yorkshire	—	—	52	56
RYE	32	35	—	—
BARLEY .. Essex, com. Malting	33	34	—	—
Kent, Norfolk, Distillers' & Grinding	29	31	—	—
and Suffolk .. Chevalier	34	36	—	—
MALT.. Essex, Norfolk and Suffolk	—	—	58	60
Kingston, Ware, and town made	—	—	60	63
OATS .. Norfolk, Cambridgeshire, Lincolnshire, and Yorkshire, feed	—	—	20	22
Ditto, Poland and potato	—	—	25	26
Northumb., Berwick, & Scotch potato	—	—	27	29
Ditto, feed	—	—	24	26
Devon & West Country, feed or black	—	—	17	20
Dundalk, Newry, and Belfast, potato	—	—	24	25
Ditto, feed	—	—	21	23
Limerick, Sligo, and Westport, potato	—	—	23	25
Ditto, feed	—	—	20	23
Cork, Waterford, Dublin, Youghal, and Clonmel, black	—	—	16	19
Ditto, white	—	—	18	21
Galway	—	—	13	15
BEANS.. Ticks	34	37	40	44
Harrow and small	38	42	45	50
PEAS.. Boiling	42	44	—	—
Hog and gray	38	42	—	—
FLOUR.. Town made (per sack of 280lb)	—	—	43	48
Norfolk & Suffolk, household (do.)	—	—	37	41

FOREIGN GRAIN.

	Shillings per Quarter. FREE.
WHEAT.. Dantzic & Konigsberg, finest high mixed white	54 to 58
Ditto, good mixed	53 56
Ditto, red mixed	51 55
Stettin and Rostock	54 56
Danish	50 53
Hamburgh and Pomeranian	53 55
Black Sea (nominal) hard to soft	41 47
Riga, St. Petersburgh, and Liebau, soft	41 46
Canada	53 57
Spanish	56 59
Buck or Brank	33 35
INDIAN CORN	28 32
BARLEY.. Hamburgh, Dantzic, Konigsberg, and Riga	28 30
Ditto, Grinding	24 28
Danish, Mecklenberg, and Pomeranian	23 28
OATS.. Dutch, brew, & Poland, Friesland, & Groninigen	24 26
Danish and Swedish	19 22
Russian	20 23
BEANS.. Tick	36 40
Small	42 45
Mediterranean	28 30
PEAS.. White boiling	40 42
TARES (none)	— —
FLOUR.. United States	25 29
Canadian	24 28
INDIAN CORN MEAL (per brl. of 196 lbs.)	15s. 15s. 6d.
RYE FLOUR (per ton)	6l. 10s. 7l.

IMPERIAL AVERAGES.

For the last Six Weeks.

Week Ending:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans. s.	d.	Peas. s.	d.
Nov. 13, 1847..	53	8	32	4	23	4	33	7	45	9	48	3
Nov. 20, 1847..	54	3	32	0	22	11	32	10	45	11	49	0
Nov. 27, 1847..	52	11	31	6	22	10	32	10	44	6	48	5
Dec. 4, 1847..	52	1	30	8	22	5	28	11	44	0	49	7
Dec. 11, 1847..	51	11	30	5	22	4	31	0	42	7	47	7
Dec. 18, 1847..	52	2	30	7	21	7	34	4	41	6	48	2
Aggregate Average of the six weeks which regulates duty	52	10	31	3	22	7	32	3	44	0	48	6
Comparative Average same time last year......	59	11	43	2	26	3	42	11	45	8	48	9

No Duties are now to be levied on the importation of corn or flour until March 1st, 1848.

PRICES OF SEEDS.

BRITISH SEEDS.

Linseed (per qr.).. sowing 60s. to 63s.; crushing 48s. to 50s.
Linseed Cakes (per 1,000 of 3lbs. each)...... £13 to £13 10
Trefoil (per cwt.)............................ 12s. to 20s.
Rapeseed, new (per last) .... £30 to £32
Ditto Cake (per ton) ....£6 to £7
Mustard (per bushel) white .. 7s. to 7s. 6d.; brown 8s. to 9s.

FOREIGN SEEDS, &c.

Linseed (per qr.).. Baltic 48s. to 52s.; Odessa 50s. to 52s.
Linseed Cake (per ton) .... £9 to £10
Rape Cake (per ton) .... £6 to £6 10s.
Clover, red (duty 5s. per cwt.) per cwt......... 30s. to 43s.
Ditto, white (duty 5s per cwt.) per cwt......... 35s. to 50s.
Carraway (per cwt.).......... 36s. to 38s.; new 38s. to 40s.
Coriander (per cwt.) .... 18s. to 21s.
Hempseed (per quarter)....................... 35s. to 38s.
Canary (per qr.)............... 65s. to 66s.; fine 67s. to 68s.

HOP MARKET.

BOROUGH, Monday, Dec. 27th.

There is a continued moderate inquiry for the better descriptions of Hops, which fully maintain the currency of last week.

POTATO MARKET.

SOUTHWARK WATERSIDE, Dec. 27.

In consequence of the contrary winds this market has been supplied sparingly; but the trade generally having sufficient by them of former shipments, there was but little demand except for the best samples, which went off readily.

The following are the present prices:—

	s.		s.		s.		s.
York Regents	130	to	140	Kent & Essex Regents	100	to	140
Do. secondary......	120	to	125	Do. Blues	120	to	130
Scotch Whites and Mixtures	90	to	100	Do. Kidneys	110	to	140
Dutch...............	70	to	80	Do. Shaws	100	to	120
Hamburgh	80	to	100	Wisbech Regents..	100	to	120
				Do. Shaws	100		

BUTTER, CHEESE, BACON, AND HAMS.

Butter, per cwt.	s.	s.	Cheese, per cwt.	s.	s.
Dorset...........	108 to	112	Double Gloucester	58 to	64
Carlow...........	90	96	Single	58	64
Sligo	86	88	Cheshire	56	76
Cork, 1st.........	88	90	Derby	62	66
Waterford	88	89	American.........	30	50
Limerick	86	—	Edam and Gouda	—	50
Foreign, prime			Bacon, new	68	—
Friesland......	106	110	Middle............	58	62
Kiel............	94	102	Hams, Irish.........	40	60
Fresh Butter, per doz.,			Westmoreland...	88	—
12s. 0d. to 14s. 6d.			York...............	94	—

WOOL MARKETS.

BRITISH WOOL.

LEEDS, Dec. 23.—We have no alteration to notice in this branch of business during the present week; few sales have been made—prices remain the same.

LEICESTER, (Friday last.)—The price of fleece wools from the growers remains about the same, with rather more doing: — 20s. to 22s. for ill-conditioned Ewey lots; and 24s., upwards, for the best.

LIVERPOOL, Dec. 24.

Scotch.—There has been a little more doing in Laid Highland Wool this week, at lower rates, to clear off before the new year. White Highland nothing doing. There has been little, if anything, done in either Crossed or Cheviot, that little has been in favour of the buyer.

	s.	d.		s.	d.
Laid Highland Wool, per 24lbs	5	6	to	6	3
White Highland do	8	6		9	0
Laid Crossed do .. unwashed....	8	3		9	6
Do. do... washed	9	0		10	6
Do. Cheviot do... unwashed	8	6		11	0
Do. do... washed	11	6		15	0
White do. do................	20	0		22	0

FOREIGN WOOL.

LEEDS, Dec. 23.—Very little business has been done in foreign wools this week, nor is any improvement looked for before the new year.

HIDE AND SKIN MARKETS.

			s.	d.		s.	d.	
Market Hides,	56 to	64lbs.......	0	1½	to	0	1¾	per lb.
Do.	64	72lbs.......	0	1¾		0	2	„
Do.	72	80lbs.......	0	2		0	2½	„
Do.	80	88lbs.......	0	2¾		0	3	„
Do.	88	96lbs.......	0	3½		0	3¾	„
Do.	96	104lbs.......	0	3¾		0	4	„
Calf Skins			4	0		6	0	each.
Horse Hides			10	6		0	0	„
Polled sheep....................			3	6		4	8	„
Halfbreds......................			2	8		3	6	„
Downs..........................			2	6		3	1	„

AGRICULTURAL QUERIES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

Sir,—Would you allow me to inquire of your numerous readers, the best way of applying to agricultural purposes the refuse fat of the chandler? It has some sulphuric acid mixed with it. In what way; to what crop; and in what quantities it should be applied, and the probable worth per ton?

Dec. 14, 1847. W. G.

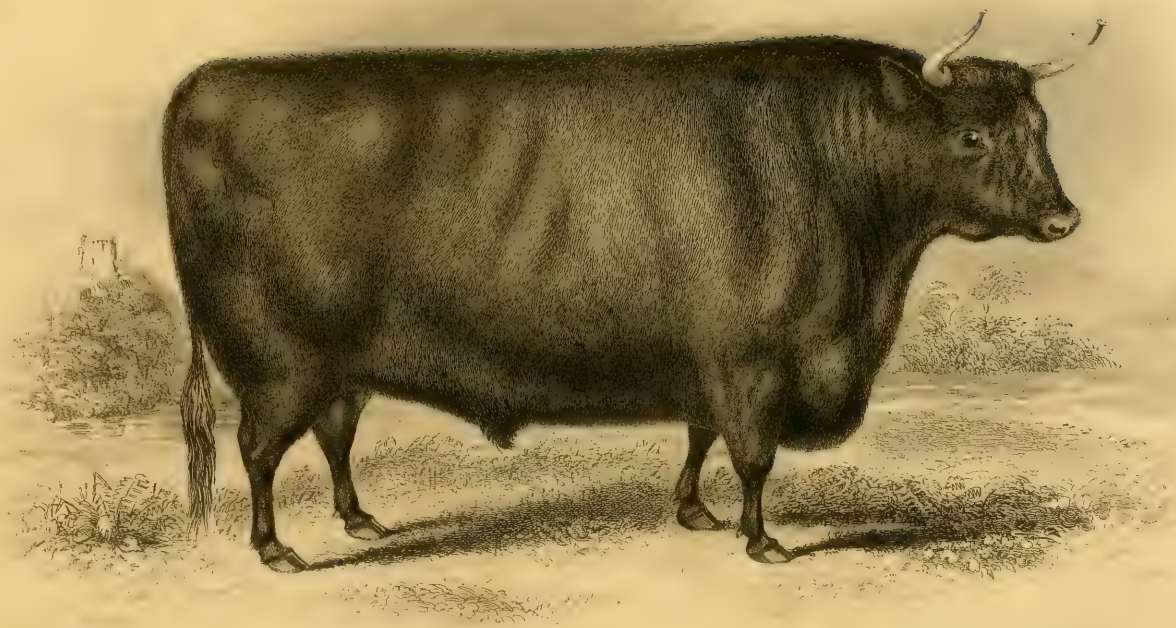
Sir,—I should feel obliged if some one of your numerous scientific readers would kindly answer the following question, viz.:—"Whether or no it is chemically correct to mix hot slacked lime with guano previous to sowing?" Having seen a friend of mine practise it, and failing myself to convince him it was decidedly wrong, I thought of seeking through your valuable magazine the opinion of some one more competent than myself. Trusting you will favour me by inserting this in your next,

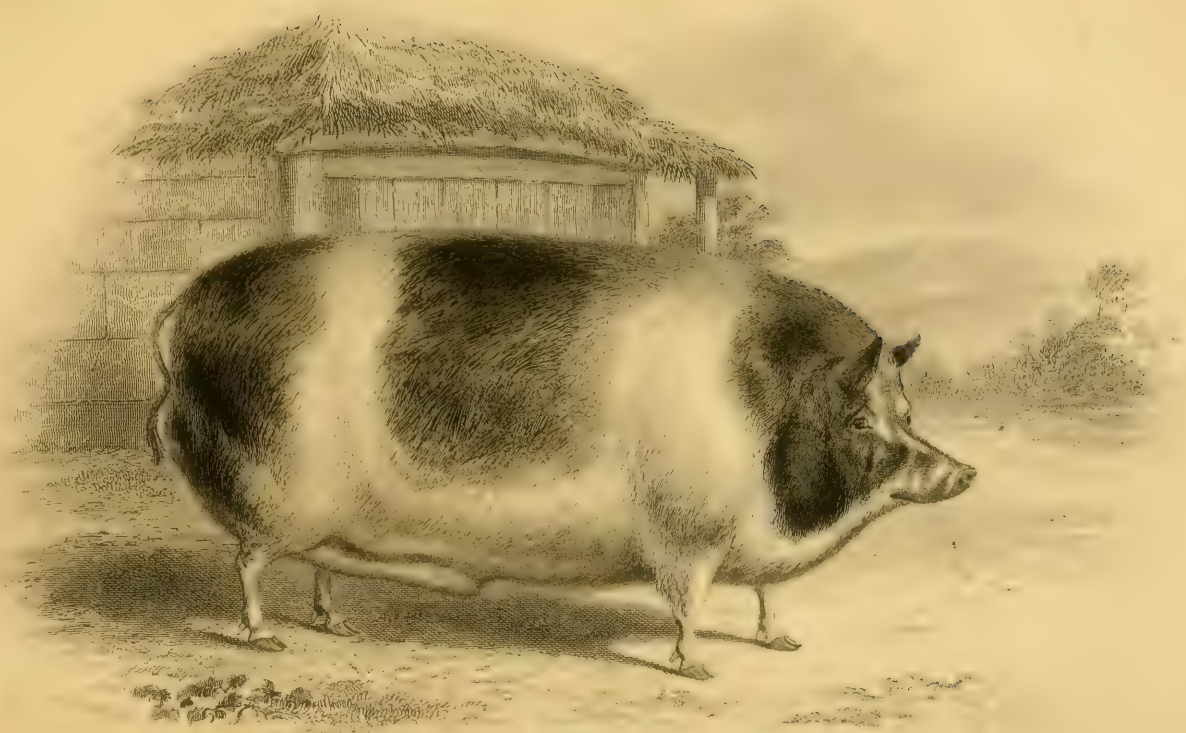
I am, sir, your obedient servant,

A Constant Reader.

Fenstanton, Hunts, Dec. 14, 1847.

Printed by Joseph Rogerson, 24, Norfolk-street, Strand, London.





AGRICULTURAL SOCIETY

THE FARMER'S MAGAZINE.

FEBRUARY, 1848.

No. 2.—Vol. XVII.] [Second Series.

PLATE I.

DEVON BULL.

The subject of this plate, a Bull of the Devon Breed, the property of Mr. Thomas Bond, of Bishop's Lydeard, Somerset, obtained the Prize of Fifty Sovereigns at the show of the Royal Agricultural Society, at Northampton, in July last, "as the best Bull calved previously to the 1st day of January, 1845."

PLATE II.

BOAR OF THE LARGE BREED.

A Prize of Fifteen Sovereigns was awarded to Earl Spencer, at the show of the Royal Agricultural Society, at Northampton, in July last, for the animal represented in this plate, as "the best Boar of a Large Breed."

THE POTATO CROP OF 1848.

BY J. TOWERS, MEMBER OF ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

In taking a prospective view of this subject, so far from attempting to make any apology, I conceive it to be the duty of every person conversant with horticulture, who has devoted time and attention to the extent that I have done, to come forward, and by *truthful* statement of *facts*, relieve the public mind from that suspense which the contradictory statements of a certain portion of the press have excited. Professor Johnston, of the Edinburgh Agricultura-Chemical Society, has endeavoured—and I believe most successfully—to prove that in the whole range of vegetable beings we do not possess any *substitute for the potato*, no one which contains or can supply the elements (in suitable quantities) that constitute its nutritive properties. We may safely *rely* upon the evidence of this truly able and veracious authority; but were that not at hand, the common sense of every person who knows what a well-dressed mealy potato is, and has seen the quantity of starch which, when grated in a raw state, it will produce, must decide that no representative of this inestimable tuber can be produced in Britain.

In this view of the case, and perfectly satisfied

by the comparison of published statements, I declare myself the advocate and unflinching supporter of its widely extended cultivation; and as the season of planting approaches, I feel that no time is to be lost. As I firmly believe that the disease did *all but* vanish in 1847 (local exceptions and wilful misrepresentations being admitted), and, moreover, being satisfied that the actuating cause of the malady has been determined, I shall with confidence invite every one who has ground to spare, to plant abundantly, and therefore to devote some attention to the following suggestions. As to the primary *cause* of attack, we must resolve it into *an epidemic* produced by a certain but indefinable condition of the *atmosphere*. The universality of the attack in 1845, the sudden and rapid destruction of the leaves, followed by a *progressive* decay of the stem and tuber; the partial renewal of the phenomena during 1846, a summer of a totally opposite character, which was so hot and arid in May and June as to spoil the crop, and to reduce it far below its ordinary average; these and other circumstances prove that every attempt to refer the malady to insects or mildew must be utterly futile. Finally, the two articles in the *Gardeners' Chronicle* of Jan. 8th, which point to certain conditions of the atmosphere, both at home and abroad, may be deemed conclusive, since they offer evidences of results that could be scarcely mistaken.

If, then, we may conclude that the causes were atmospheric, we ought to dismiss the theory of spontaneous decay, and to go on resolutely, in hope that the epidemic will not recur; though, perhaps, it would be very imprudent to plant diseased potatoes, since corrupted juices may at least tend to produce a weakened and unsatisfactory progeny. To come at once to facts: When I came to Croydon (May 7th last), I found a small plot of ground, perfectly fresh from a field, tenanted by buttercups, wild fumitory, and grass; the soil exceedingly deep, and of homogenous quality—a light sandy loam, replete with vegetable matter. I wished to try the ash-leaved kidney, with the double motive of experiment and to obtain an early supply; but the stock was gone, and I could only purchase one gallon of a refuse mixture, comprising the smallest tubers of kidneys, white and red, and some small round variety, which might be the Jersey blue or regents. I digged the ground, removing the weeds, and planted, as the work went on, in rows three feet asunder—the smaller tubers *whole*; the larger, if about the size of a walnut, divided by a *single cut* downward from the crown end; in either case, six inches apart, and fully four inches deep. No *manure* whatever was applied, excepting about a peck of coal-soot and a few handfuls of salt scattered over the surface after the rows were covered. The plants made their appearance in June; but so dry was the weather, that their progress was slow till July; then, however, it was rapid, and the haulm became so strong that all the spaces were completely filled; and, finally, after the few effective showers which fell, it intermatted from its great length. A friend, about the end of July, who had witnessed some decay in crops about Hertford, asserted that my plants must fail, as he detected a brown tinge about one or two of the tuber-bearing processes of a root that I had raised for his satisfaction. The *potatoes* then attacked were not larger than horse-beans, and the plants were left undisturbed till the end of October; but the centres of the yard-wide spaces were dug a full eleven-inch spit deep, and the earth laid against the stems, as I found that many tubers were visible at the surface. After the October rains, some leaves became black and effœte; but I could detect none of the fatal spots or mouldiness, nor any of the fœtid odour of decaying vegetable matter which had tainted the air in 1845, and partially also in 1846.

In the mean time every approachable plot in garden and field for miles around Croydon had been inspected; I had watched the growth of acres, looked over the diggers, and questioned the venders of purchased crops, and can safely affirm that, so far as could refer to the termination of the *early Shaws*, no complaint was made; the results everywhere were satisfactory, and our tables were supplied at receding and moderate prices. In October I certainly observed a total blackening and fall of some leaves; and the dealers talked of, and even showed some marbled tubers; but again the alarm subsided. Whole breadths of the Jersey blues were stored quite sound in condition, and even those dealers who had raised their prices sold at 3s. the single bushel.

November came in, and I began to dig and use my own stock. I had 15 short rows from the miserable progeny I planted; and in the end obtained at least a crop twenty-five fold its bulk. The tubers were generally of fine flavour, but had suffered in size from the great heat and drought of July. Of diseased tubers, perhaps about a score, slightly discoloured, or mottled, have been rejected, but not one instance of decay has yet yet been discovered. Many of the potatoes are of fair middle size, white and purple rounds and kidneys; these are in constant use, and all the others, of from one to two ounces, are good in flavour.

From this fair and closely observed experiment I have a right to infer—

First. That fresh meadow land replete with turfy matter, and so light as to suit the rhododendron, the broad-leaved kalmia, the azalia, and several heaths, is a perfect medium for the potato, bring-

ing a most wretchedly weak tuber to a condition of powerful, nay, over-luxuriant growth.

Second. That in such fresh virgin soil putrescent manures are never required; but as the potato is a lime and potass plant, it would be prudent to dress with a liberal allowance of quick-lime in the autumn.

Third. That entire tubers, of the size of a pullet's egg, planted—the ash-leaved in two feet apart, the Shaws and their kindred varieties at three feet, in all cases six inches in the rows, as deep, and standing the crown ends uppermost, are safer than cut sets, and are effective as tubers of double the size.

Fourthly. That, whether entire potatoes or *sets* from those of the largest size be employed, not one should be planted which has sprouted in the stores, unless we except those very early varieties which, having been air-greened and kept apart, shall have been started in a warm place for the express purpose of advancing their progress.

I shall pass over the evidences of soundness or disease that have been given in the newspaper reports, they are too contradictory to admit of any reliance. That disease *does* exist we are not prepared to deny, but there is every reason to hope and believe that it is passing away. We have treated the potato very unwisely, and may have induced debility, a watery condition of the fluid, which it is probable would terminate in decay; but unless the prime cause of an epidemic recur we shall not *lose the potato*. As a precaution, however, one borne out by evidence, the early and middle-early sorts (none later than the *Shaw's*) should be extensively planted; and these ought to be in the ground during February and March. I am aware that many very small stunted tubers have again been yielded in consequence of unseasonable heat and aridity; but my experiment has established the fact, that in favourable light ground a tuber not three quarters of an inch across can protrude a stem four feet long, and of corresponding strength in all its members. I now refer to an elaborate report which is just published in the *Journal of the London Horticultural Society*, vol. iii., part 1, commencing page 46. This article comprises *experiments* with a vast variety of *artificial* manures, upon the Jersey blue potato, and some other varieties, planted either in rows or on hills earthed or not earthed up. By the results, which are minutely reported, we find no reason to believe that any sort of manures, simple or compound, can avert or remove (existing) disease. I have no space to particularize, and must therefore, in justice to it, refer to the paper itself. But a short extract may be permitted, as it may prove that the writer has seen reason to conclude that the malady is on the wane. Some disease had been detected in the stems even as early as July, and on this it is remarked that—"Judging from a comparison of symptoms and extent of disease at the beginning of July in this and the preceding crop, it certainly was not anticipated that the plants would exhibit any signs of decidedly healthy vegetation during the remaining period of their existence. In the course of last July, from prostrated stems some very fresh, healthy foliage was however produced; *healthy tissue was in many instances protruded over the cankered portions of the underground parts of the stems*, and fresh roots were also emitted. Nothing like this healthy action was evinced by potato plants in 1845 and 1846, in the garden of the society, at a similar period of their growth."

Seed sowing has been recommended, but it failed in this garden "as immediately *regards the disease*;" and I am sure that at Hertford *seedlings* were more affected than plants raised from sets.

Upon the whole we find by the form assumed this year (1847) that the modified decay of the stem and tuber strings had its origin in *the tainted condition of the tubers of* 1846!! At all events, it becomes a duty to be cautious and observant.

THE EFFECT OF COMMON SALT ON THE WIREWORM.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The chemical substances which have been hitherto suggested as destructive to the wire-worm have been of little practical value; they have either been deficient in *power* or in the *economy* of the agent. Salt seems to be an exception to the rule, and I cannot but feel highly gratified at the recent good success of an application whose powers I long since endeavoured to support. We do not perhaps adopt a good course of reasoning when we feel inclined, as is too often the case, to regard as practically useless all chemical applications for the destruction of the insect vermin of soil. In the case of common salt we have an instance of this. This invaluable substance does in fact fulfil some of the essential conditions for the successful employment of all such dressings. It possesses both a certain degree of destructive effect upon the wire-worm, and it is abundant in quality and very reasonable in value. I propose then, in this paper, to repeat a few observations which I have elsewhere had occa-

sion to make on the use of salt for the destruction of the wire-worm, and then to subjoin some remarks upon the use of other chemical substances for the same purpose. This course I shall pursue for two reasons—first, because the evidence in favour of salt is such as fully to warrant more extended trials; and secondly, since in proposing the examination of such an application it will perhaps give some confidence to the sceptical to be convinced that there are other chemical substances whose power has been shown to be considerable for the same important end.

It has been contended that the salt can hardly be expected to descend sufficiently into the soil for any useful purpose in this way; but this is an erroneous conclusion, since it is ascertained that the salt readily penetrates sufficiently into the soil, to destroy many of the insects in their cells. Of this Mr. Lennox Bigger, in a recent communication, bears valuable testimony, when he remarks (*Agricultural Gazette*, Dec. 4, 1847), "I beg to state my own use of salt for upwards of 20 years; and I do so, feeling that I have been very much benefited by it. Having at that time seen that it was doubted whether or not it was a manure or beneficial to the land, I made trial of it first on lea (grass), on which I had it sown like seeds before ploughing the land; and to satisfy myself as to any effect it could have in the first instance, I turned up the sods which had been ploughed down, and found no trace of the salt, for it had all melted away by the damp of the grass or the atmosphere, and in place of it I found slugs, snails, worms, clocks, and every insect to which our climate is usually subject, lying dead. This decided me to persevere in the use of it, and I have never omitted it any one year during the course of the time I have stated; and latterly I have shaken it over land in all states of cultivation, both before and after sowing the seed, but most particularly on stubble and at the breaking up of grass land. I sowed at first about seven cwt. per acre, for fear of putting on too much; latterly I have increased it to half a ton, which is the least proportion I would recommend. The proof of the result of adopting my plan can easily be made in any garden. When pulling up cabbage stalks sprinkle a few handfuls of salt over the bed; watch the effects. In less than a quarter of an hour you may observe that the slugs, snails, and worms, have dragged white lines after them, and at the end of each you will find the insect lying dead. The reason a few of my neighbours did not follow my practice, I am certain, was that some who did so put on such large quantities that they totally destroyed the crop. One of them, for instance, put three tons on an acre of potatoes; of course none of them grew, and I was often told that it would destroy the crop, and indeed in their way of applying it I did not doubt it; but, on the contrary, I declare that in the twenty years I have used it I never saw the appearance of any bad effect from it, and I can have no doubt that, judiciously sprinkled over the manure heap, it must have a benefit which, if not exactly seen, is now well understood in agricultural science." In the same page in which Mr. Bigger's communication is found, Mr. Mechi adds (Nov. 23, 1847) some important evidence as to the value of salt in the way just described. He observes—"During the last twelve months I have applied salt very liberally to my manure in the yards and tanks. The salt was brought in by the cartload, and spread or thrown about by the shovel. My bailiff was alarmed at the quantity, but we carted the manure and ploughed it in, and there are now growing upon it wheat, tares, and winter barley, all looking perfectly healthy. The animals seem much more healthy when they have access to salt. I have at least 120 pigs in my yards, and have not lost one for six months. The salt is applied freely and frequently to the corner where the pigs dung. It removes effluvia very quickly. Any weeds that are collected are placed in heaps, and readily decomposed by admixture with salt. My observations," he adds, "lead to the following conclusions: That salt and water are destructive to wireworm, slug, and other vermin; that salt decomposes very rapidly any insect, or dead vegetable matter, without injury to growing vegetation; that salt is injurious to heavy or wet and undrained lands, making them wetter and colder, and delaying vegetation; that it forwards the crop in drained lands; and that it attracts and retains moisture." And again recurring to the action of salt on insect vermin, he continues, "My swedes escaped the ravages of the cockchafer grub on the salted manure, and are of a very heavy quality and a full plant." There are many other practical farmers ready to give evidence of the destructive effects of salt on insects. Mr. William Beardsley, of Shipley, near Derby, observes, in a letter to the editor of the *Derby Mercury*—"I apply salt as a top-dressing to all my white crops (I have been using salt pretty freely for 10 or 12 years past) in the months of April or May, as the season may be, by sowing broadcast three or four cwt. per acre, taking care to do this after sunset; and I repeat this dressing in about three weeks, if required, which seldom happens. If the young plant should appear sickly and turn yellow, it is a true sign that the slug and wireworm are making ravages upon it, and I have always found the application of salt to exterminate these destructive insects. I believe that slugs, &c., will not generate in lands so treated. I have found that my yield of wheat is four bushels to the

acre more from the salted than from the unsalted land, when all other circumstances have been precisely the same; and I also find that where salt has been employed I get a much bolder, brighter, and heavier sample of wheat; and I have been entirely free from rust, blight, or smut, ever since I have been using salt." Mr. F. Fairbank, of Sible Hedingham, thinks, from repeated trials, that salt at the rate of four bushels per acre, dug-in the previous winter, a complete prevention of the louse in peas.

It is evident then, from these trials and observations of the practical farmer, that common salt possesses considerable power upon the wireworm; and if it should even be shown that the influence of this salt upon this pest in its mature state is less considerable than upon the insect in its less advanced stages, even such a discovery would only require a variation in the season and mode of its application. To proceed, however, to the result of various trials with other chemical substances. "I will now," remarks Mr. J. Curtis (Jour. R. A. S., v. 5., p. 203.), "give the experiments made by Bierkander; and although their application to the crops may not be so beneficial as one could desire, yet they may be useful in directing the cultivator in the pursuit of this subject. 'I have,' says this learned Swede, 'made many experiments to discover by what means the wireworms may be destroyed. Many were put at one time into tea-cups filled with the following vegetables, viz.:—

		d.	h.
Garlic.....	amongst which they lived	9	0
The leaves of the spruce fir..	do.	0	14
The leaves of the fir	do.	0	10
Ledum palustre (an Irish plant)	do.	0	9
Myrica gale, sweet gale, or Dutch myrtle.....	do.	0	2
In water they lived		4	0'

"It thus appears evident that any endeavour to destroy the wireworms by drowning them is almost impracticable; for they not only exhibited signs of life in water for four days, but I think it probable that if a field were laid under water for a much longer period, it would not destroy them. This, however, might be easily tried in some situations; and to ascertain the truth is worth the trouble.

"Many other applications have been recommended, and amongst them spirits of tar and chloride of lime. One correspondent in the 'Gardeners' Chronicle' (vol. iii., p. 233) says, 'Spirits of tar is the most effectual remedy with which we are acquainted for destroying the wireworm. We should therefore recommend any one to saturate some sand with that compound, and mix it with the soil in the beds of ranunculus and anemone when they are turned up in autumn.' J. W. C. (*ibid*, vol. iii., p. 737) having lost his crops from wireworms, also says, 'Thinking that spirits of tar might do good, when I sowed dwarf French beans again, before covering-in the rows I watered them with a strong solution of it; and the result was that they came up very strong and healthy, and the produce was enormous, while the first crop gradually dwindled away, and died a premature death.' The refuse lime of gas-works is stated to be efficacious in banishing these pests from the garden. Previously to the crop being planted a thin covering of the lime should be spread over the ground, and it must be well mixed up with the soil in digging (*ibid*, vol. ii., p. 777). F. H. B. 'had been using some chloride-of-lime water, and poured it over some grass, when it immediately killed the worms. From this success he was induced to try it on some very sickly carnations infested with wireworms, and had the satisfaction to find them recover rapidly. The proportion used was about a table-spoonful to a pint of water, but that of course must depend on the quality of the soil.' (*ibid*, vol. iii., p. 318.) It seems necessary to employ it with caution, in the flower-garden, at least; for in the same journal it is asserted, 'We have great doubts whether chloride of lime, although considerably diluted, would not be injurious to picotees, and commit as much havoc amongst them as the wireworm. We recommended you to spread some of the refuse lime from the gas-works over the surface of the bed, the effluvia of which will probably drive them away.' (*ibid*, vol. ii., p. 777.)

In the Journal of the R.A.S., (vol. ii., p. 132) Mr. Burgess, of Elmhurst, Bucks, says, 'This year I applied the *nitrate of soda* to my wheat, when, from the wet season and the wireworm, the plant was nearly destroyed, and I found it particularly beneficial, the wireworm either being killed by the application or forsaking the roots; and consequently I think I have above an average crop of wheat.' The ammonia, which invigorated the plants, at the same time destroyed the insects; and it is added that the turnips grew so fast that they soon got out of the way of the fly (*Altica nemorum.*)'

"It is also positively affirmed that if *lime and soot* be applied to the soil before sowing any grain, it will kill the wireworms. *Salt* likewise, on light sandy soils, is highly efficacious in destroying them; and of its effects upon these animals it is in the power of every one to convince himself, and also of the strength required for their destruction, by dissolving a teaspoonful or more of salt in a tea-cup full of water, with some wireworms in another, half full of pure water, when, by adding the salt water by degrees, the exact effect produced upon the life of the animals will be ascertained; and

the same of course may be done with spirits of tar, &c. In alcohol the wireworms expire in five minutes, but spirit of turpentine destroys the vital principle almost instantaneously. It is not, however, easy to kill them by a change of temperature, and yet in an artificial state it is extremely difficult to rear them."

Upon the importance of these researches it is needless to enlarge. It is true that our limited information has not yet enabled us to determine with certainty upon the best and most effective mode of attacking these pests of the farm. But our ignorance on this head is no reason why we should undervalue the results which have already been obtained. These doubts and difficulties too, let us not forget, ever attend the operations of agriculture; a science whose practice is surrounded with the dangers and uncertainties attendant upon variable seasons, of enemies of all kinds and sizes, and whose first principle—to add to our difficulties—rests upon the mysterious action not of *dead* but of *living* matter.

ON THE ECONOMY OF THE REFUSE OF TOWNS, AND ITS CONVERSION INTO MANURE.

BY ALFRED GYDE, ESQ., M.R.C.S.E.

In the last number of the Farmer's Magazine we described the mode of converting the night soil of Paris into a dry manure, and pointed out a practical mode by which the refuse of our own towns and villages may be rendered available for the same purpose. Before leaving the subject it may not be uninteresting to describe the process adopted at the works of a company in Paris, under the direction of M. M. Baronnet, for the preparation of the "*noir animalizé des champs*," or *animalized black*.

The refuse of sugar bakeries, which consists of animal charcoal, combined with blood and a little lime, has long been known, and highly valued in France as a fertilizer of the first class, and immense profits have been realized by its employment. But, unfortunately, this animal matter is rather expensive, and commerce furnishes a quantity but very insufficient for agricultural purposes; an idea was therefore entertained of forming a manure which should possess almost identical properties, and which might be able to replace it, by turning to account the fæcal matters, disinfected by a cheaply prepared charcoal. This new manure, which is called *animalized black*, is made from turf which is carbonized, and then mixed with sewage matter; a substance is thus obtained possessing several of the properties of the animal black of the sugar bakeries. In both cases we have an absorbent powder, somewhat like charcoal, which takes up the ammoniacal compounds as quickly as they are found, and which yields them back again but very gradually and slowly. This slowness and regularity in the production of ammonia forms, probably, one of the principal reasons that give to the black of the sugar refineries a value as a manure, and is especially advantageous in the present case; for the sole inconvenience in the employment of fæcal matters, when used as a manure according to the ordinary methods, consists in their too rapid and energetic action.

In the fabrication of this manure the first thing necessary is to make choice of an earth rich in organic remains, so that it may by carbonization furnish a sufficient quantity of charcoal; it is further necessary that it should be capable of being readily divided and pulverized, and that during calcination it be not formed into solid masses, as happens when the earth is of too clayey a nature. By the employment of an earth so carbonized we are enabled to produce a manure, rich in nitrogen, which retains and turns to profit all the animal substances of the fæcal matters. This manure, which is sufficiently valuable to render it an article of commerce, may be manufactured with rapidity; the time required being about one month in summer, or two in winter; and its mode of fabrication does away with every smell which could prove injurious to the surrounding neighbourhood.

The process used in preparing the animal black at the works of the company may be divided into two stages: first the collection and disinfection; and secondly, the combining with the carbonized earth.

Two substances are employed for the purpose of disinfection, and with pretty equal success. The first is the residue from the fabrication of the sulphate of iron, which may generally be obtained at a very trifling cost. Another preparation, often employed at the same factory for the purpose of disinfection, is equal quantities of the foregoing solution, with a solution of common soap. We have thus formed a metallic oleate, which appears to become more readily decomposed than the sulphates under the influence of hydrosulphuric acid and of hydrosulphate of ammonia. In all cases, the soap and fatty liquids are of use in this opera-

tion for the purpose of forming over the surface of the soil an oleaginous layer, which prevents the diffusion of the hydrosulphuric acid gas and other vapours. This operation of disinfection transforms the volatile ammoniacal salts which exist in the fæcal matters, into a fixed salt—*i. e.* into sulphate of ammonia.

The fæcal matters when brought to the manufactory, are turned into basins, and, by means of a shovel, are mixed with an equal volume of carbonized earth; the mixture being rendered as perfect as possible, and after leaving it to settle for some time, the liquid portion is allowed to drain off at the lowest end by means of a sluice. The mixture is then removed, and spread on a hard floor beneath a shed or covering, and dried in the air, care being taken to frequently rake over and expose new surfaces, to facilitate the operation of drying. When the drying is complete, it is again returned to the basins, and a second portion of fæcal matters added, the mixing and drying process being conducted as in the former instance. This process is repeated until the earth forms about a fourth part of the obtained product, which generally takes place on the third addition, provided the operation be properly conducted, and especially when the fæcal matters which are employed contain a large proportion of solid products.

This operation, which under the employment of carbonized earth gives out but a very trifling odour, consumes about one month in summer and two months in winter; the most favourable season for the fabrication of this manure being the spring, and this season is best adapted for preparing the principal stock.

The mode of carbonizing the earth consists in placing it on shelves in an oven, which is heated to dull redness; from half to three quarters of an hour being required to carbonize each charge, which, when removed from the oven, is received into iron boxes: these are closed with air-tight covers until cool, when the carbonized earth is fit for use.

The earth employed should be sifted and rendered as fine as possible: that of a clayey nature is good as the ash which it produces is finer and more absorbent; but when the proportion of clay is too great, it is liable to form itself into brick-like cakes—an accident which ought always to be avoided.

Where peat or peaty soils are to be obtained, the plan of burning, or rather carbonizing, recommended by Mr. W. Uppleby, in the fifth volume of the Royal Agricultural Society's Journal (p. 507,) would be found to answer all the purposes required.

Painswick, Jan. 1848.

FEEDING STOCK WITH PREPARED FOOD.

Many of your readers will, doubtless, remember that in the Transactions of the Yorkshire Agricultural Society for 1846, a prize essay or report was published, on the feeding of stock with prepared food. The straightforward manner in which Mr. Marshall treated the subject in his report, and the high character of the gentlemen by whose evidence he supported his statements, attracted a good deal of attention then, and much anxiety has since been felt to ascertain if longer experience confirmed the favourable opinions expressed respecting this novel system.

With a view to make this subject fully known, Mr. Hutton, of Sowber Hill, near Northallerton, invited a large party of intelligent and influential agriculturists to visit him on Thursday last, and spend the whole of the day in examining his stock, and in witnessing the process of preparing and serving the food.

To parties at a distance, it may be here necessary to state, that Mr. Hutton farms his own property to the extent of 1,400 acres, and occupies a leading position among the agriculturists of his neighbourhood.

Being kindly invited to join this party, I arrived at Sowber Hill about ten o'clock on Thursday morning, and was immediately shown through the various farm offices by Mr. Hutton. We went first to the houses containing the fat cattle, where there were fifty heifers tied up, all looking very healthy exceedingly clean, and nearly ready for the butcher. They had finished their first foddering of cooked food, and I think only one beast out of the fifty was standing when we went round; and for the restlessness of this animal a sufficient reason was given.

We then went to the boiler-house, and I saw the boiled linseed mixed with the chaff for the horses at noon. We next proceeded to the house where the straw is cut into chaff. A powerful straw-cutter, made by Crosskill, was at work, driven by two horses. Barley-straw was being cut, in the rough state in which it came from the thrashing-machine: the machine was cutting at a great rate, and, considering the state of the straw, made good work. In the same building, but in a story over the straw-cutter, one of Clyburn's bruising machines is fixed, and at a later period in the day we

saw it bruise, very satisfactorily, both linseed and oats. This building is quite separate from the thrashing barn; for this immense establishment keeps two horses constantly at work, cutting straw and bruising corn; and the straw of nearly four large corn-stacks is required each week, at this season of the year, for chopping or for bedding. We then went through the fold-yards containing the lean stock.

Mr. Hutton's attention being now occupied by the arrival of the rest of the company, I quietly walked back to the steaming-house, in order to examine more thoroughly the house itself, and the apparatus it contained.

The house is a plain building of one story, open to the roof. It is twenty-four feet in length, fifteen feet in breadth, and about fifteen feet to the eave. The floor is paved with brick. There are three moderate-sized windows in the walls, and a small ventilator in the roof. The furnace and steam-boiler are placed in one corner of the room, and sunk about three feet below the floor. Closely adjoining the steam-boiler, but on a level with the floor, the boilers, three in number, for holding the linseed, are placed in a row against the wall. The metal of these boilers is double, and the steam which boils the linseed is conducted by pipes into the space between the inner and the outer case of the boilers. A force-pump stands in a corner of the house, and water is thrown by it into a large cistern, from which, by ball taps, the steam-boiler is supplied. The chopped straw and bruised linseed and corn are all weighed before they are taken to the steaming-house, and no more is brought there than is wanted at a time.

The cost of the steaming-apparatus, I understand, is about £50. The house could not cost much, if built new; but it appeared to have been an old house—probably a hind's cottage—applied to its present purpose.

About one o'clock we had lunch, and at half-past went to the steaming-house, where we saw the food mixed for the four o'clock feed of the fifty fat cattle. The chopped straw, in due proportion, was first spread upon the floor, about two feet thick, and with this the proper quantity of bean-meal was well mixed. About five stone of bruised linseed, with 120 gallons of water, had been put into the boilers three hours before (that time being necessary for cooking it properly), and was now a thick, oily kind of broth. This liquid was laved out of the boilers into pails, and was thrown boiling hot upon the heap of chopped straw and meal, with which, by rapid turning, it was at length thoroughly blended. It was then shovelled into a tidy heap in a corner of the room, and smoothed down by patting with the back of the shovel. In this state it was left for an hour and a half; and in the mean time we walked over the farm.

It would be easy of me to write of various things that interested me during this walk, especially the draining and fencing; but respect for your space induces me to confine my remarks to the growth of linseed—a point intimately connected with the subject of this article.

One of the fields through which we passed was cropped last year with linseed on one part, and with oats on the other. I was anxious to see the effect of the linseed crop upon the land, as to its encouraging the growth of couch grass—a point held in much apprehension by many farmers. I was accompanied by a practical man of close observation; and after examining this field with great attention, we were both of opinion that the land—about six acres—on which the linseed was grown, was quite as clean as that which had been cropped with oats; but as the latter had been mown, and the former pulled, one stubble *seemed* more foul than the other. The linseed appeared a good, bright sample; and Mr. Hutton calculated the crop to average twenty-four bushels per acre.

A little before four o'clock we returned to the homestead, and saw all the fat cattle receive their last meal of the cooked food we had seen prepared before we walked into the fields.

An ordinary feeding-basket-full was given, in its warm state, to each animal; and it seemed to be eaten very greedily.

The boiler-house is not very near the feeding-houses; but eight baskets filled with this food were placed at one time upon a sort of long barrow, which was wheeled to each house; thus the whole number of cattle were fed by two men in about twenty minutes.

We now adjourned to the house, where our party, consisting of about twenty-five, sat down to an excellent dinner. After the usual loyal toasts, Mr. Hutton produced a carefully prepared statement of the cost of this method of feeding. The following is a copy of that part which related to fat cattle:—

For one Beast.	s.	d.
13 lbs. of linseed bruised, or 2 lbs. per day for six days, and 1 lb. for Sunday	1	9
32½ lbs. of ground corn, or 5 lbs. per day for six days, and 2½ lbs. for Sunday—at 1d. per lb.....	2	8
35 lbs. of hybrid turnips, given twice a day for six days, and thrice on Sunday.....	1	6
Coals, 1½d.; labour on each beast, 6d.....	0	7½
Total cost of each beast, per week..	6	6½

The horses, cows, and young stock, also get some of the cooked food, evidently with great ad-

vantage; but I do not think it necessary to state the calculated cost of this.

In conclusion, as Mr. Hutton remarked, it is now satisfactorily proved, that fat cattle of the best quality may be produced on farms where no hay is grown; that double the usual number of cattle may, by this method, be fattened on the ordinary quantity of turnips; and that abundance of the richest manure may, consequently, be made at home.

Some modifications of this method of feeding would be required on small holdings; but to occupiers of large farms, I strongly recommend its immediate adoption.

I much regret that urgent business called me away from Mr. Hutton's directly after dinner, for I thus lost the advantage of hearing the valuable remarks which I feel sure would be made by many of the experienced gentlemen who were present.

N. J. TURNER.

Richmond, Yorkshire, Dec. 27, 1847.

THE LATE SIR CHARLES GRANVILLE STUART MENTEATH, BART., OF CLOSEBURN.

The *Dumfries and Galloway Courier* announced the demise, at Edinburgh, on the 3rd of December, of this worthy, beloved, and indefatigable gentleman, to the deep regret of all Nithsdale and districts far beyond its bounds. Few, if any, were so thoroughly identified with the interesting, picturesque, and even romantic section of country, the Nith waters; and fewer still ever laboured with the same assiduity, intelligence, and skill to render a broad domain alike improving, fruitful, and ornamental—in short, an honour to the whole south of Scotland. Among the earliest and most ardent reclaimers of land, Sir Charles had no equal in his own county; and, considering all he did, by example and precept to benefit others—the halls he so long gladdened, to which strangers of respectability were ever welcome—and the estates he so unweariedly aggrandised and adorned—we confess it is not without pain we reflect on the removal of one of our greatest land-marks from scenes which knew and honoured him once, but can now, alas! know him no more. Nor was it the possession of property alone, or the uses to which he turned his patrimony, that endeared him to thousands: during his long life he established many other claims to public regard, by the honour that stamped all his actions, and the exercise of those kindly feelings and sympathies, which in him were as expansive as the air he breathed, or the winds that wander elastic over his native hills.

The deceased was lineally descended by his father's side from the Stuarts, the ancient Earls of Menteith; and by his mother, the daughter of Lady Catherine Hastings, from the Earl of Huntingdon, who was the father of the latter; and though few could claim a higher descent, Sir Charles never prided himself on his ancestry, or the adventitious in fortune, however honourably acquired. On the contrary, he deemed it of far more consequence to stand independently erect on his own merits, by cultivating the rules of rectitude and manly bearing, and by promoting within his own sphere and generation the good and happiness of all around him, including the very poorest, to whom he was ever an unfailing friend, in common with all the members of his family. Early in life he married an amiable lady, descended from the Fergussons of Craigdarroch, and Johnstones of Westerhall, both old Dumfries-shire families.

In politics the deceased was ever consistent; and having adopted at an early period the Whig principles of government, he became no changeling in after life. Still he was utterly free from disaffection, and a patriot in the best sense of the word. At a perilous era in British history, when Bonaparte threatened the country with invasion, he enrolled under the highest sanction, in his own parish, a fine body of men, a hundred strong, called the "Closeburn Sharpshooters;" and not only clothed, armed, and drilled them under competent auspices at his own expense, but, more than this, kept them embodied in Dumfries, as head quarters, a month every year, equally free of charge. The corps contained yeomen and others of the highest respectability, few of whom, it is feared, survive; but who, had fortune ruled differently, when their services were required, would have followed their leader devotedly in the cause of their country, even to the cannon's mouth.

While yet a mere youth, and only nearing the years of majority, the father of Sir Charles Menteath, himself a gentleman of very varied attainments, delegated to his son the entire management of the estate of Closeburn; and, as the result proved, from no mistaken estimate of his latent zeal, courage, and capability. Correctly speaking, the best land in the parish was then a wild compared to what it has since become; and though but few survive who can recal the events of the last half century, it would be difficult to select in any part of Scotland a more triumphant illustration of the truth of the saying—

> "When energising objects men pursue,
> What are the prodigies they may not do."

Acting instinctively on the maxim, long before the words were penned, he divided, subdivided, drained, and fenced, whether with thorns or stone walls, until even the naked heath, which feels so sparingly in its barrenness the genial influence of spring, incipiently indicated foundation laid of the more animating fertility which accumulates germs to blossom like the rose. Years rolled on, and each as it elapsed found the agricultural sentinel at his post, planning fresh triumphs over the inert and neglected in external nature, undeterred by the heavy expense incurred. And, while thus busied, from morn till dewy eve, with all the varied forms of improvement,

he found leisure, with the consent of his sire, to devote his attention to another important object—the erection of an elegant mansion of the Grecian order of architecture, however uninviting the site chosen must have appeared to many in the first instance. In fact, for a mile or more in front, the surfaces flanking the fine old castle, and its noble garniture of stately trees, were disfigured by peat hags, quagmires, and brushwood of the most unsightly description; but here the great enchantress, cultivation, also waved her wand, until the loose became solid, the broken shapely, and the rugged smooth, over hundreds of acres superadded to terra firma; and in the end vistas were opened, near and in the distance, screened by plantations in the most classic forms of landscape gardening, upon which the eye of even the passing traveller rests with delight. Irrigation followed, in the case of meadows noted for their teeming crops of hay, cured after the English fashion—an improvement the subject of this memoir was the first to introduce to any extent, although now practised universally, wherever the available means exist.

Although the lime-works, which have proved of signal benefit to a wide district by the employment they diffuse and the minerals procured, the quickening properties of which have produced, in countless instances, a soul under the ribs of vegetable death, were undoubtedly opened previously to the time of Sir Charles Menteath, their importance had not gathered a tithe of its fame until placed under his direction. By the application of water power and other means, he enlarged greatly the capacity of the mines, as may be inferred from the altered herbage even sheep-walks bear, over miles on miles of surrounding country. From this he was led by an easy transition to facilitate, by practically-economical means, the introduction of coal into the same district—a mineral in which Dumfries-shire is singularly deficient, with the exception of its extremities—Langholm and Cannobie in one direction, and Sanquhar and Kirkconnel in another. With a view to this, so far back as 1811, and again in 1816, he employed Mr. Buchanan, the well-known engineer, to survey Nithsdale for the formation of a railway, at his own cost, and we need hardly add how long antecedent to the period before the general public had become alive to the importance of the gigantic undertakings to which the most costly aqueducts of the ancients are poor in comparison.

Again, during the dawn of turnip husbandry, and when the "neep" was only known as a pot-herb in the South of Scotland, his attention had been drawn to the importance of green crop; and, although his recommendations made little impression on the minds of his tenants, he persevered, notwithstanding, by offering to pay all the charges of one of them if he would only visit the Lothians and judge for himself. This offer was at length accepted, although the intelligent ruralist generously declined travelling at his landlord's expense. Forth, therefore, he went, armed with introductions, and returned so favourably impressed with all he saw and heard, that the new mode of culture found willing patrons on the estate of Closeburn, until, by degrees, extensive uplands all but the exclusive manor of beasts of the field and fowls of the air, produced splendid crops of bulbs, where little save heath and bent grew before. If originally the higher lands of Closeburn were naked, how shelteringly and tastefully they have been clothed since with the garniture that attempers the bleakest winds that blow, and is so engagingly graceful as the seasons revolve. In this department his operations were very extensive; and, if sometimes reminded that the outlay was great and return distant, he invariably replied that the time would come when every inclosure thus adorned would repay himself or successors a hundred-fold.

For the science of mechanics he had a strong natural bent; and it was often remarked that, had his fortune been different, he might have become an eminent civil engineer. To his ingenuity coachmen owe the drag, which can be worked with the greatest ease at top, without the trouble of descending from the seat—a very valuable invention, as a means of safety, apart from the relief it ministers to stage horses over all hilly roads. This discovery he introduced a good many years ago; and, so far as we recollect, it was first tried on the Dumfries and Edinburgh mail, before it became a favourite helm in coaching, under the patronage of Mr. Croall, Edinburgh. Only a few days preceding his last illness, he was earnestly engaged in devising more effectual means for preventing locomotive engines and the carriages attached diverging from the rails on which they run.

In all the domestic relations of life he enjoyed a spotless reputation, worthy of his name, character, and station; and had the high satisfaction of knowing that his children, in this respect, by walking in his footsteps, had profited by his example. But he was also, as has been mentioned, a favourite with all, not only in his own immediate neighbourhood, but in circles different, and even distant. Ten years ago he was invited to a public dinner in the town of Thornhill, and, after a suitable speech, under the presidency of Robert Hewitson, Esq., Auchenbenzie, presented with an epergne of high value, aptly designated "The Menteath Testimonial."

The funeral, which took place on Friday se'nnight, in the family burying ground, Dalgarno church-yard, a sequestered cemetery on the banks of Nith, was followed by a numerous body of mourners, including a long line of carriages, with equestrians, and even pedestrians in great numbers. The service in the hall was highly impressive; and, when the mourners rose to hear the first prayer, they resembled in numbers an ordinary congregation of Christian worshippers. As the mournful procession passed along, hundreds stood at their doors under much emotion, to seize a last lingering look of the obsequies of one so much beloved in life, and in death deservedly and sincerely lamented.

The deceased left two daughters and seven sons; Philadelphia, Countess of Mar, and Miss Menteath, who resides with the Dowager Lady Menteath, Edinburgh; James, now Sir James Menteath, Baronet of Closeburn; Thomas, late Captain of the 16th Lancers; Chas. G. S. Menteath, barrister, Lincoln's-Inn Fields; William, Major, H.E.I.C.S.; the Rev. Francis Hastings, rector of Thornpark, Yorkshire; Alexander, writer to the

Signet, Edinburgh; and the Rev. Granville Wheeler, rector of Rauceby, Lincolnshire.

On Sabbath se'nnight, the funeral sermon of the deceased was preached by the Rev. Mr. Bennett, parish minister of Closeburn. The pulpit and family gallery were hung with black, in deference to the mournful occasion, and Sir James and two of his brothers were present, the latter both rectors of the Church of England. The rev. gentleman spoke from the heart to the heart; and, irresistibly affected himself, he made a corresponding impression on all who heard him. Few knew Sir Charles Menteath better; and never was a picture of character more naturally drawn, or one from its perfect truthfulness that prompted more conspicuously the united tears of a sorrowing congregation.

FARMERS' CLUB HOUSE.

MONTHLY MEETING OF THE COMMITTEE OF MANAGEMENT.

Monday, January 3.

Present: Messrs. E. Aitcheson, J. Beadel, W. Fisher Hobbs, W. Shaw, J. Tyler, and Jonas Webb. W. Fisher Hobbs, Esq., in the chair. The minutes of the last committee were read, confirmed, and signed by the Chairman of this day. The minutes of the Annual General Meeting were also read. The following gentlemen were elected members:—

L. Bencraft, Esq., Barnstaple, Devon.
T. Price Bligh, Esq., St. Peters, Bedford.
J. C. Cobbold, Esq., M.P., Ipswich.
J. Miller, Esq., Morfa Manor, Aberystwith.
W. Thorne, Esq., Barnstaple, Devon.
J. T. Way, Esq., 32, Alfred-street, Bedford-square.
W. Whitehouse, Esq., Exchange Buildings, Liverpool.

The names of nine other gentlemen proposed as members were read for the first time. The following subjects were selected for discussion during the present year:—

February 7.—"On the value of Town and Sewage Manure; the best and cheapest mode of conveying it to the Country, and the best form of application for Crops."—Proposed by the Rev. J. B. Warren, of Horkesley Hall, Essex.

March 6.—"On the best mode of Draining the strong Clay Soils and Subsoils of this Kingdom for Surface Water."—By Mr. W. Bullock Webster, of Hounsdown, Southampton.

April 3.—"The importance of Union between Landlord and Tenant to develop the Resources of British Husbandry."—By Mr. Robert Smith, of Burley-on-the-Hill, Rutland.

May 1.—"An inquiry as to the relative proportion of Burdens borne by the Fixed Capital, compared to those borne by the Floating Capital on Land."—By Mr. C. H. Lattimore, of Wheathampstead, Herts.

June 5.—"To consider what steps can and ought to be taken to improve the moral and social condition of the Agricultural Labourer."—By Captain Aitcheson, of Tunbridge Wells.

November 6.—"Upon the best and most economical application of Grain to Fattening Animals, and its comparative value with Oilcake, Linseed, and other substances used for feeding purposes."—By Mr. Robert Baker, of Writtle, Essex.

December 6.—"On the pernicious consequences resulting from the payment by the In-coming to the Out-going Tenant, for Tillages and Manure made on the Farm, according to the custom of some districts, and commonly called 'Tenants-Rights.'"—By Mr. W. Shaw, of the Strand, London.

The discussions to commence at half-past five o'clock, p.m. There will be no meetings for discussion in July, August, September, or October.

Some other business relative to the management of the club was also disposed of.

THE MURRAIN AMONG CATTLE.

At the monthly meeting of the Highland and Agricultural Society of Scotland, held at Edinburgh, on Wednesday, 12th Jan., the secretary read a communication from the Board of Trade, to the effect that the epizootie, which was thought to be disappearing, had broken out with greater violence than ever among the horned cattle of Wallachia, and that three-fourths of those which had been spared from last year's visitation were falling victims to it. The secretary said, that though the communication just read had reference to the state of the epidemic in a distant country, the directors conceived it to be their duty to submit to the public all information conveyed to them on so important a subject, in regard to which Professor Dick, who was present, had promised to give to the meeting the results of his experience. Professor Dick then rose and made the following statement, which we give as of great interest to the public at present:—Professor Dick stated that pleuro-pneumonia was still prevailing with great violence, and varied with the weather. It existed at present to a great extent in East Lothian, as well as in Aberdeenshire, and throughout the north. He was informed yesterday, by one of his pupils, who is in practice at Maybole, in Ayrshire, that there has only been occasionally a solitary case for fifteen miles round during the last twelve months. He considered its origin and propagation to be atmospherical, and attributable to influences to which man and the lower animals were equally exposed; in illustration of which the Professor referred to the existing epidemic in the form of influenza, under which he himself was evidently labouring, and in consequence of which the public schools have been partially closed. The disease consisted of active inflammation of the lungs, and in the pleura which covers them and lines the chest. It was attended with great danger, particularly when the pleura was principally affected; and such cases generally were fatal, unless the proper remedy was immediately applied; because, when that membrane is attacked by inflammation, being what is called a serous membrane, it very rapidly proceeds to pour out serum and lymph between the lungs and ribs; the chest fills with water, and the animal sinks and dies rapidly. Man, and all the domesticated animals, are liable to the disease, although they may not be equally affected at the same time. Horses, as well as dogs, during the present epizootie, have been less affected than cattle. The disease is not, generally speaking, so fatal in horses as in cattle, because horses, being under continual notice, were better attended to; the symptoms were at once noticed, and they were seldom lost. The same would be the case with cattle, if properly looked after; but too little attention is paid by the

breeders and rearers of cattle to the health and comfort of their stocks and the symptoms of their diseases; they, at the same time, are not so much under the immediate observation of their owners. Indeed, the early symptoms very readily escape notice, because they are obscure. To illustrate the treatment required, the Professor referred to a case in Lanarkshire, where he had been called on for advice; his instructions to the smith or farrier on the property were, that he should bleed whenever he observed any cough or alteration in the milk or feeding; clean out the bowels by laxative medicine—say 1 lb. of Epsom salts, nitre, tartarate of antimony in large and repeated doses; repetition of bleeding; blistering the sides, and even firing if necessary. After the inflammatory action has been subdued, tonics should be administered. By following this course the smith has acquired a local celebrity. It was sufficiently simple if adopted at an early stage of the disease; but if the disease has made a certain progress, no reasonable hope of success can be entertained.

MORE FACTS ON THIN SOWING.

TO THE EDITOR OF THE ESSEX HERALD.

Sir,—I give the following additional facts as I received them in writing upon thin sowing, the same being made and reported by Mr. Charles Hall, of Layer-de-la-Hay, in this county:—

White Wheat, 20th October, 1846, quantity 20 rods.

Pecks.		Bus.	Pks.			
5	sown produced	3	3½	equal to	31	bushels per acre.
7	„	5	2	„	44	„

Red Wheat, on 32 rods, or one-fifth of an acre, sown the 8th of November, 1846.

Pecks.		Bus.	Pks.		
5	produced	7	0 or 35	bushels per acre.	
8	„	9	2 or 47	„	

R. Baker.

Writtle, December 29, 1847.

THE VETERINARY COLLEGE.

TO THE EDITOR OF THE MARK LANE EXPRESS.

Sir,—In a letter which I addressed to you, and which appeared in the *Mark Lane Express* of the 22nd ult., reflections were made on what I considered to be a gross dereliction of duty, in not giving the pupils at the Veterinary College a proper degree of instruction in the practical part of their education.

On this subject much more might be adduced, but I trust that sufficient has been said on that particular point to draw the attention of the proper authorities to this important subject; but not only has there been a want of attention to the proper instruction of the pupils after they have become such, but every applicant is admitted who presents himself, with sufficient fees, without any attention as to what may have been his previous pursuits, however at variance they may have been with that general knowledge of animals and their habits, without which the knowledge requisite to their treatment in disease is with difficulty acquired, and the requisite tact so essential to skilful manipulations never perfectly attained.

In the original laws of that institution it is clearly manifest that particular attention was paid to this subject. It is not requisite to enter into a history of the causes which have led to a neglect of the original laws; but while all other branches of science, during the last fifty years, have become more and more strict in the requisite qualifications, and enlarging the curriculum of study, the veterinary schools have not only ceased to advance, but actually have been retrograding. It is true that recently a slight improvement has taken place; but still it is far behind what was originally intended by the founders of the institution.

If we were, like the human branch of medicine, possessed of the advantages of large hospitals, infirmaries, or dispensaries, in which the ravages of disease could be largely noted, then an apprenticeship might be of little or no value. But with us it is different; we have nothing of the kind, not is it probable we ever can have, since what may be valueless to the medical profession becomes to us of paramount importance.

The simple dressing of a foot or a wound, or administering a dose of medicine, may be easily acquired; but the patience, the tact, the capability of making available all or every source which may be within reach in cases of emergency, can alone be acquired by careful training.

The necessity of an apprenticeship is, with those who know most of the subject, looked upon as imperative, not because they approve of apprenticeship simply, but from there being no substitute for it.

With these simple facts before us, it cannot but strike every one, who may take the trouble to reflect, how strange that those who have the management of our only English veterinary school, should so long and so virulently oppose its introduction, throwing every impediment in the way: admitting as pupils those whose pursuits have been at total variance with the knowledge of animals; classing them with those who have been previously trained, requiring no longer attendance, nor giving them more instruction; submitting them to the same ordeal as those who have devoted years to the acquirement of the principles of their art; launching the trained and less trained upon the public as equal in capability. Of this, both parties so situated, as also the public at large, have equally to complain—the least taught, that he has been deluded into a belief that he has been instructed in all that is requisite to insure moderate success in the outset of his professional career, while, alas! he finds that the

first requirements for which he has need are almost unknown to him;—the previously trained, and therefore better taught, has still stronger reasons to complain, for not only has he been placed below his proper level, but has further to complain of the diminished estimation in which he is held in the eyes of his employers;—the public, in consequence of the failure of the imperfectly taught. Again: the public have to complain that the unqualified should be palmed upon them by high-sounding testimonials, but which they soon discover to be of little worth, but tending to the injury of all parties.

It is in vain to attempt to blink a question of such a nature. It might have done in days long past to say, as Professor Sewell said to me when I first entered as a pupil many years since, when he ascertained what had been my previous pursuit, that the sooner I forgot all that I had learned under my father the better it would be for me; but time, the test of all things, has proved the fallacy of such recommendations, and has taught me, from long experience, the necessity for elementary instruction.

I beg particularly to draw the attention of all parties interested in so momentous a question as the fitting education to be adopted for the proper formation of the future veterinary practitioner; and more particularly do I wish to direct the attention of the managers of our veterinary schools to this important subject.

I remain, your very obedient servant,

ALEX. HENDERSON,

Veterinary Surgeon to the Queen Dowager.

Cockspur-street, Jan. 21.

ON AGRICULTURAL CHEMISTRY.

BY JOHN BENNET LAWES.

It is a matter of surprise that so little is actually known upon the theory of agriculture. Its practice is nearly coeval with mankind, while as yet it scarcely exists as a science. Ask the most experienced farmer to explain the principles which govern the routine he is daily in the habit of practising. Ask him to determine the value of any rotation of crops, or their comparative exhausting powers. Ask him what ingredients must be restored to the soil to keep its fertility unimpaired, or the exact manner in which climate influences his produce. His answers will be vague and unsatisfactory. But these, and a thousand other questions of a similar nature, are capable of solution by science, and they must be answered before agriculture can be said to rest upon a satisfactory foundation.

Independently of the money which must annually be lost in fruitless experiments, the disadvantages attending the want of fixed rules in agriculture are many. Numbers of men possessing capital are deterred from farming by the proverbial uncertainty of the profits attending it; and many who follow the profession of agriculture, and have the means, will not freely embark their money on the improvement of their farms, for want of that knowledge which would enable them to calculate their returns with any degree of certainty. Hence, too, the tenant farmer is frequently compelled to adopt a rotation of crops entirely prejudicial to his interest, retained only because it happened to be the custom of our ancestors a century ago, while the same rotation is enforced upon the farmer who expends £8 an acre on his land as upon him who expends only £3.

Liebig's work on Agricultural Chemistry, published in the year 1840, attracted very generally the attention of British agriculturists. In those pages they were first made acquainted with the important aid they were likely to obtain from the science of chemistry applied to the cultivation of the soil. The work of Sir Humphrey Davy upon the same subject can hardly be said to have influenced the practice of agriculture. He applied the knowledge of chemistry, as it then existed, with his usual sagacity; but at the period in which he wrote, organic chemistry was quite in its infancy. The labours of the German and French chemists during the last thirty years have principally been directed to the study of organic chemistry, which owes it present important position to the number of accurate analyses they have given to the world. It is much to be regretted that Liebig should have altered, in the third edition of his work, so many of the views and opinions laid down in the first; or that a hasty visit to England, during which (as he says in his preface) he made himself acquainted with practical agriculture, should have caused him to pronounce as valueless the experiments of Boussingault, whose opinions are entitled to respect, as coming from one in whom are combined the scientific chemist and the practical farmer. Without entering into the merits of the different opinions maintained by these distinguished chemists, I may here observe that many of the errors into which Liebig has fallen have, I think, arisen from his not sufficiently considering what agriculture really is. *Practical agriculture consists in the artificial accumulation of certain constituents, to be employed either as food for man or other animals, upon a space of ground incapable of supporting them in its natural state.* This definition of agri-

culture is, I think, important, as distinguishing English agriculture at least from the system pursued in various parts of the world, where the population is small and the land of little value, viz. of taking only the natural produce of the soil, without any effort to increase it, and in time abandoning it for a soil as yet undisturbed. If Liebig had sufficiently considered this distinction, he would not have assumed that certain substances employed as manures are of little value, because plants and trees, in their natural state, are capable of obtaining them in sufficient quantity for their use. The great problem to be solved with regard to manures is, what substances is it necessary to supply to the soil in order to maintain a remunerative fertility? The solution of this question appears easy enough, regard being had only to the composition of the crops removed. Practically there are, however, great difficulties attending it, which can only be entirely overcome by a long series of careful and costly experiments. If the ash theory advanced by Liebig, and so industriously propagated by his pupils, were founded on truth, a careful examination of the ashes of plants, and a few simple calculations upon the amount of mineral substances exported from the soil in corn, meat, &c., would at once enable us to explain and remedy the exhaustion of our soils. The farmer, when he sends his load of wheat to market, would bring back the few pounds of minerals which the wheat contained, and the return of these to the soil would enable him to produce the same amount of wheat for the market the following year. Unfortunately, however, the ground-work upon which this theory is raised is unsound, when agriculture, as distinguished from natural vegetation, forms the subject of consideration.

Agricultural plants, which practice has shown to differ widely from each other in their respective relations to soil, climate, manuring, and position in rotation, possess at the same time widely differing powers of reliance upon the atmosphere for the constituents which it is known to supply in a greater or less degree. If grain crops held the same relation to natural and artificial supply of their organic constituents, as the leguminous plants and turnips, the farmer would not require the assistance of the latter crops; but since, compared with these, the grain crops are in some important respects far more dependent upon artificial supply to the soil of certain organic constituents, of which the price is high and the supply limited, it becomes necessary to employ certain plants which possess the power of collecting these ingredients from the atmosphere, and such procedure constitutes a rotation of crops.

For some years past I have been engaged in a very extensive series of experiments upon my farm, with a view to determine some of the more important questions which are constantly arising in the minds of agriculturists. It would be impossible in a paper of this description to enter into a detail of the plan I have pursued in conducting these experiments. Keeping in mind the motto of the Society, '*Practice with science*,' I shall now merely select those results which bear most upon practical agriculture, and which appear to me most suitable to my present purpose. The greater portion of these experiments, and the various points of science connected with them, will be discussed with more propriety in an independent work. The views which I have adopted, and which I shall now endeavour to explain, have arisen during the course of these experiments; but it is very probable I shall have reason to modify them as the investigation proceeds.

I certainly place great reliance on the experimental results which I possess; every operation has been conducted under the eye of Dr. Gilbert, a gentleman who received his scientific education in the best British and continental laboratories, and has applied that accuracy which modern science demands, both to the operations of the laboratory and the field.

In the first place I shall offer some general remarks upon the growth and nature of the common agricultural plants, and afterwards endeavour to show the effects of manures upon them.

The crops which form a rotation belong, botanically speaking, for the most part to the three following natural orders of plants:—The *gramineæ*, containing wheat, barley, oats, rye, and the grasses which constitute our natural pastures; the *leguminosæ*, containing beans, peas, tares, lucerne, clover, trefoil, sainfoin, &c.; and the *cruciferæ*, containing turnips and rape. The *solaneæ*, yielding the potato, and the *umbelliferæ*, carrots and parsnips, may also be noticed. For the purposes of agriculture, however, a different system of classification might be adopted with advantage, having reference to the organ or part of the plant which is the object of cultivation. In clover, tares, and pasture, we generally require leaf and stem, which may be termed the primary organs of plants; in the turnip we require the bulb, or intermediate organ; and in the grain crops, peas, beans, &c., the ultimate organ, the seed.

In considering this subject it is necessary to bear in mind that the natural aim of every plant is to produce a perfect seed, and that, when growing in a soil and climate adapted to its special habits and peculiarities, it produces no more of each organ than it requires for the healthy perpetuation and

reproduction of seed. When the leaf has fulfilled its office, the nutritious fluids circulating through it are withdrawn, and it decays or dries up. These fluids enter into the stem, and, rising higher and higher, are at length deposited in the seed. Plants are therefore required by agriculturists in two distinct conditions, one in which the nourishment is more or less circulatory, the other in which it is fully elaborated and deposited: in one case water constitutes above three-fourths of the weight of the produce; in the other it does not generally amount to one-fifth. Although the agriculturist possesses the means of developing the circulatory or elaboratory conditions of plants by manures and mechanical operations, climate exerts the greatest influence over them. By climate I mean the quantity of rain that falls, the number of days on which it falls, and the temperature during the period when the plant is actively growing or forming seed.

As the experiments to which I am about to refer were performed during the seasons of 1844-5, and 6, I wish to make a few observations upon the climate of each season, and to show how the general condition of the crop was influenced by it. The temperature and fall of rain I have taken from the tables published by the Horticultural Society at Chiswick, from which my farm is little more than 20 miles distant, consequently the climate may be said to be nearly identical.

Number of days' Rain during 30 wks. and 4 days.

	1844	1845	1846
April	7	15	18
May	7	21	10
June	10	8	2
July	10	21	16
August	16	21	17
September	12	11	6
October	19	13	24
	81	110	93

Inches of Rain during 30 weeks and 4 days.

	1844	1845	1846
April	0.33	0.99	3.84
May	0.26	2.88	1.35
June	0.97	0.98	0.64
July	1.94	2.16	1.60
August	2.00	3.32	4.82
September	1.27	1.68	1.39
October	4.19	1.48	5.50
	10.96	13.49	19.14

Mean Temperature during 30 weeks and 4 days.

	1844	1845	1846
April	51.1	48.3	47.0
May	54.2	49.5	55.7
June	62.3	61.8	66.3
July	64.3	62.0	64.7
August	60.4	58.9	65.2
September	60.0	55.2	62.5
October	50.2	51.2	52.7
	57.5	55.2	59.1

Mean Temperature above or below average.

	1844	1845	1846
April	4 above	1.0 above	Average
May	½ below	1.8 above	3 above
June	2 above	0.9 below	6¼ above
July	1.6 above	0.9 below	2 above
August	2.2 below	4.6 below	2.7 above

The season of 1844 was remarkable for bad crops of hay, clover, late-sown barley, and oats, very fine wheat with very short straw, and average turnip crop. In 1845 there was abundance of hay and clover, bad quality of wheat, abundance of straw, and one of the largest crops of turnips ever known. In 1846 the grass and first crops of clover were unusually abundant, wheat was of very fine quality, straw moderate, turnips deficient. Of course, there are plenty of exceptions to what I have stated, and these remarks do not apply to those places in which the climate varies much from that of London; but I have given what I believe to be the general character of the crops within a circle of 100 miles from London.

The soil upon which my experiments were tried consists of rather a heavy loam resting upon chalk, capable of producing good wheat when well manured, not sufficiently heavy for beans, but too heavy for good turnips or barley. The average produce of wheat in the neighbourhood is said to be less than 22 bushels per acre, wheat being grown once in five years. The rent varies from 20s. to 26s. per acre, tithe free. The fields selected for purposes of experiment had been reduced to the lowest state of fertility by removing a certain number of corn crops without applying any manure, and wheat and turnips were chosen for the subjects of investigation. The wheat-field consists of 14 acres: the crops removed since it was manured—barley, peas, wheat, and oats. In 1844, the first experimental wheat-crop was harvested, and the fourth is now growing. The turnip-field had not long been taken in hand, and was known to be in so poor a condition that it was at once put under experiment, and in 1843 the first crop of turnips was sown, and they

have been continued each year since, the produce being removed and weighed. The wheat-field was divided into a certain number of equal spaces, of which one has been left unmanured and one received 14 tons of dung every year; the remainder of the plots received different descriptions and quantities of artificial manures.

The following table gives the climate of the three years from the beginning of May till the end of October. I have considered the climate as affecting the grass to be that of April and May; wheat-climate to commence with May and end with August; turnip season to begin with June and end with October:—

	1844	1845	1846
Number of days' rain during April and May (grass season)	14	36	28
Number of days' rain from May to end of August—17 weeks (grain season)	43	71	45
Number of days' rain from June to end of October—21 wks. (turnip season)	67	74	65
Inches of rain during April and May (grass season)	0.59	3.87	5.19
Inches of rain from May to end of August—17 weeks (grain season)	5.17	9.34	8.41
Inches of rain from June to end of October—21 weeks (turnip season)	10.37	9.62	13.95
Mean temperature during April and May (grass season)	52.6	48.9	50.5
Mean temperature from May to end of August—17 weeks (grain season)	60.3	58.2	63.1
Mean temperature from June to end of October—21 weeks (turnip season)	59.4	57.8	62.2
Temperature above or below average from May to end of August (grain season)	above 0.9	below 2.1	above 3.2

It will be seen that the two spring months of 1844, April and May, were unusually dry; the quantity of rain and the number of days in which it fell were both small; the summer was hot and dry, and the autumn moderately rainy. An entire absence of the climate necessary for an enhanced accumulative and circulating condition of plants prevented the favourable growth of the spring crops, and a hot and dry summer favoured the depositing and elaborative condition, and produced good quality of grain. In 1845 the great number of wet days and the low temperature of the summer were highly favourable to a circulatory condition of the plant, consequently green crops of every description and straw were unusually abundant, and grain of bad quality. In 1846 the spring was very favourable to a circulating condition, producing luxuriant crops of grass and clover. The month of June, when the grain was forming seed, had a temperature 6¼ degrees above the average, with only two days in which rain fell, and produced very fine quality of grain. The inferior crops of turnips obtained that year, notwithstanding the large total amount of rain, arose from the almost entire absence of rain for thirty-one successive days, twice during the season. From May 21st to June 21st no rain fell, and from August 22nd to September 21st there were only three days' rain, amounting to less than one-tenth of an inch.

The following table indicates the effect of climate upon the quantity and quality of the produce of the unmanured plots of the experimental wheat-field (during three seasons); the average results of the variously manured plots are also given:—

	1844	1845	1846
Corn, per acre, in bushels, pecks, and quarts	16 0 0	23 0 0	17 3 3
Straw, per acre, in pounds	1120	2712	1513
Weight of corn, per bushel, in pounds	58½	56½	63¾
Per centage of corn to straw (straw 1000)	821	534	797
Mean of all the plots—			
Weight of corn, per bushel, in pounds	60¾	56½	63
Per centage of corn to straw (straw 1000)	868	499	765

The effect of the climate of these three seasons, as indicated in this table, is quite in accordance with the general character of those seasons. The lowest weight of the bushel and the greatest amount of straw were obtained in that season which had the greatest number of rainy days and the lowest temperature; the least amount of straw with the driest season, and the finest quality of grain in the hottest summer. On comparing the proportion of grain to straw and the weight per bushel of the corn obtained from the unmanured space, with the average results of the various experiments, it will be seen how much they agree one with another, and this is the more remarkable as manures of the most varied kinds were employed, some of which doubled the natural production of the soil.

It is highly important that experiments should be tried in different parts of England, having reference to the effect of climate upon produce. A

rain gauge and a register thermometer are all the apparatus required. If half an acre of the different crops on a farm were carefully weighed, and the relation of corn to straw, leaf to bulb, and the quality of grain estimated, we should in a few years be put in possession of sufficient data to enable us to speak with certainty upon this subject. It would then be seen that each shower of rain and each change of temperature had an effect upon vegetation, which, when once ascertained, might always be calculated on. The farmer would be able to make an estimate of the quality and produce of his crops before a grain had been removed from his field. Even with the information obtained by a careful examination of the above table, it is hardly to be doubted that the farmers in Scotland and in the north and west of England can produce turnips of finer qualily and at less expense than those who dwell in the middle and south of England, and that the farmer in the south of England can produce the best corn. By the application of capital and skill an artificial climate may, to a certain extent, be obtained. I shall point out some of the means to be employed when speaking on the subject of manures. But where equal means are employed, I think a farm upon which there is a certain number of rainy days in the summer and autumn possesses advantages in the production of green crops over another farm upon which the average amount of rainy days is less; and, on the contrary, where the least number of rainy days and the highest temperature exist, corn of the best quality can be produced. The summer of 1846, with a mean temperature of more than three degrees above the average of the climate of England, having produced grain, weighing 63¾lbs. per bushel, upon any soil from which seven unmanured corn crops had been removed, proves undoubtedly that high quality of grain to a great extent is determined by climate independently of the action of manures. We should, therefore, expect that those countries enjoying a hotter and drier summer than our own would produce corn of superior quality; and such, indeed, is the case. In spite of the wretched system of agriculture which prevails in Spain, Russia, Poland, and Sicily, the quality of their corn will bear comparison with that which the skill and knowledge of the British agriculturist can secure. The climate of Australia combines in an eminent degree the small amount of rain and the high temperature necessary for the perfect development of corn, and the wheats imported from that island obtain a price in the market very much beyond those of English growth. The following table gives the average climate of Australia compared with that of London during the summer:—

	London.	Adelaide.
Number of days' rain in four months	60	19
" inches " "	8.49	3.88
Mean temperature " "	60	79 F.

Although in producing good quality of corn the farmer labours under a disadvantage with regard to climate in England, its low temperature and moisture are exactly suited for our turnip crops, and the advantage which he derives from this plant more than counterbalances the inferior quality of his grain.

We now arrive at another important question—What is meant by quality of wheat? Does it depend upon the weight per bushel, or specific gravity of the grain? and if so, does this specific gravity bear any relation to the per-centage of gluten and albumen; that is to say, to the most highly nutritive constituents of the grain? Before entering into a consideration of this subject, it may be as well to state the opinions generally held regarding it. The grain is composed of a variable proportion of protein compounds, gluten and albumen; and carbonaceous compounds, comprising starch, sugar, gum, oil, &c. The protein compounds are employed in the organism of man and other animals in forming flesh, while the carbonaceous compounds supply heat and form fat. The protein compounds being of much the greatest importance to the animal economy, it has been generally supposed that the value of different descriptions of wheat depends upon the amount of gluten and albumen which they contain; that the wheats of hot climates contain a greater proportion of these substances than our own, that for this reason the miller purchases them at a higher price; and that by employing rich manures the farmer is enabled to increase the per-centage of gluten in his corn. To the agriculturist it is of little importance that his wheat is rich in protein compounds, unless they increase its value in the market. Now millers, who are his principal customers, know nothing about gluten and starch; they judge by the eye alone, and give the highest price for that which will yield the greatest proportion of flour. The following table demonstrates that the value of different samples of wheat does not depend upon the per-centage of nitrogen which they contain.*

* The wheat employed as seed in these experiments was the Old Red Lammas: nearly two bushels were drilled per acre. The crops of 1844 and 1846 were sown in September, and that of 1845 in March.

Nos.	Season.	General Remarks upon the History of the Specimens.	Per Centage of Nitrogen in Dry Matter.	Price per Qr. according to *present* rates adjudged by Miller and Corn Factor.
				s.
1	1844	Grown by superphosphate of lime	3.03	84
2	..	As No. 1, with ammoniacal salts	2.65	86
3	1846	Liebig's patent manure	1.81	96
4	..	As No. 3, with ammoniacal salts	1.69	92
5	..	As No. 3, with rape cake	1.89	88
6	..	As No. 3, with rape cake and ammoniacal salts	1.88	..
7	..	Exhausted soil, unmanured	1.95	92
8	..	" " with ammoniacal salts	2.01	92
9	..	" " with rape cake	1.85	92
10	..	" " with rape cake and ammoniacal salts	1.93	92
11	..	Australian, No. 1	..	112
12	..	" No. 2	1.94	112
13	..	" No. 3	2.38	112

From this table it is evident that the samples of wheat most approved by the miller are by no means those which are richest in nitrogen. His choice is directed to those samples which have the character of a perfectly developed grain, small, plump, and thin-skinned. But laying aside the evidence of experiment or common usage, would it not be more consonant with general principles to suppose that a class of plants proverbially characterized as yielding starchy seeds, and whose predominant peculiarity it is to produce carbonaceous substances, should, in their most perfect state of development, be rich in starch rather than in gluten and other nitrogenous compounds? We might, indeed, expect to find the proportion of gluten and starch vary in different species of wheat, and in the same species under the effect of different climates and seasons; but the more perfectly the grain has been developed the richer in starch and the poorer in nitrogen it would become, and millers who prefer a perfectly developed grain probably pay the highest price for that which contains the most starch.

That the gluten and albumen in wheat would increase in proportion to the richness of the soil and to the amount of nitrogen and ammonia supplied in the manure seems so reasonable a supposition that its correctness is admitted without dispute; and various experiments have been tried which appear to favour this opinion. Boussingault, in his 'Rural Economy,' says, that wheat planted in an open field gave 2·29 per cent. of nitrogen, equivalent to 14·31 per cent. of gluten and albumen, while that planted in a rich garden-soil gave 3·51 of nitrogen, or 21·94 of gluten and albumen; and Hermstadt obtained from wheat grown—

In a soil unmanured ..... 9 p. cent of gluten.
In a soil manured with cow dung 12 ditto.
" sheep ditto .. 22·9 ditto.
" bullock's blood 35 ditto.
" urine ..... 36 ditto.

It is not stated how the gluten and albumen were determined, but it is not improbable that some mechanical process was employed; at all events, I have great doubts about the accuracy or the completeness of the experiments. Thirty-five per cent. of gluten would be equivalent to nearly six per cent. of nitrogen, a quantity certainly greater that wheat ever contains. My own experiments do not give the slightest indication of an increase of nitrogenous element of wheat grain by the employment of ammoniacal manures. That the average produce of nitrogen in the crop bears a certain relation to the ammonia supplied in the manure is very evident; but the per centage of nitrogen in the grain cannot be increased by means of it. In some experiments the quantity of ammonia supplied by the manures was from 60 to 70 lbs. per acre, and in some instances more, but the analyses give no evidence of an increased per centage of nitrogen by its supply, and the highest amount obtained in the series was from an experiment where no ammonia was supplied in the manure. Dr. R. D. Thomson, in his "Experimental Researches on the Food of Animals," says, "It is a sufficiently remarkable fact, that oats increase in nutritive power in proportion to the increase of latitude within certain limits, while wheat follows an inverse law." He seems here to have adopted the prevailing opinion that the finest descriptions of wheat contain the most nourishment. The oat, which is capable of thriving in a moister and colder climate than either wheat or barley, would undoubtedly contain more nourishment when grown in high latitudes, simply because the climate is not favourable to the production of the important carbonaceous compound of gramineous seeds, starch. But with the most favourable condition of soil and climate the grain-producing plants are undoubtedly governed by one and the same law. Al-

though I have not at present traced the changes which take place during the growth of wheat, it appears to me that when sown in a soil containing abundance of azotized matter, it employs this substance at first in extending its leaf; and that where an excess of ammonia is supplied, the production of leaf is increased to an extent greatly injurious to the next operation of the plant, which is to produce stem. If an excess of ammonia is added late in the spring, the plant will no longer increase in leaf, but in stem or straw, which also may be increased to an injurious extent. When the azotized and mineral matters are properly balanced, the plant will produce no more of each organ than is essential to the favourable production of its seed. Up to the period of blooming, the compounds of nitrogen derived from ammonia are probably in a fluid or suspended state, circulating through the whole of the plant; but to what extent starch exists in the plant at this period is doubtful. When the time of blooming is passed, it is probable that the wheat derives but little nourishment from the soil; at all events, if a crop shows symptoms of poverty, it is always before this period. The circulating condition which has prevailed throughout the plant is now changed, and under a favourable condition of climate (heat, light, and dryness) an elaborative action commences; the compounds of nitrogen are withdrawn from the leaf and stem, and deposited in the seed, while starch is accumulated in a hard granular form. This deposit of starch only takes place perfectly under the influence of a high temperature; the seed is then hard, dry, and plump. In a cold and wet summer the interstices of the grain are not perfectly filled; watery fluids occupy the place of starch, and when these have evaporated, the grain is thin and shrunk. The wheat that is grown in a wet summer might therefore contain as high a per centage of nitrogenized matters dependant on the sap as that produced during a hot and dry season. The formation and elaboration of starch and other carbonaceous compounds, which for the most part supply man with his respiratory or heat-producing elements, are, it seems, greatly favoured by a hot climate, and it is probable that the heat capable of being eliminated by the process of animal respiration must first have been rendered latent during the growth of the plant.

Looking at the present state of man's existence on the earth, it may appear improbable that the value of corn should ever be in proportion to its carbonaceous product. A time may arrive, however remotely, when the surface of the earth will be peopled with men very far advanced both in their moral and physical condition, compared with its present occupants. Bread and meat will then constitute the chief sources of food—the one supplying respiration, the other nutrition; and they will doubtless bear a more philosophical relation to each other all over the world than at present. The system of cultivation in England may be considered as tending to such a result more nearly than that of most other countries; and if the principles which it involves were properly understood and carried out, we might become independent of foreign supplies, even if our population were much greater than it is now. I have before stated that the ammonia in a manure is employed by grain-plants to determine carbonaceous products: the same principle is apparent in the economy of animals. Dr. R. D. Thomson, in his experiments, found that the cow which received the largest amount of nitrogen in its food produced the greatest weight of butter; and the general experience of agriculturists ascribes the most fattening properties to those substances which contain the greatest proportion of nitrogen. Although ammoniacal manures favour the elaboration of carbonaceous matters in grain, we might expect to find a different result in examining the seeds of the leguminous plants. The peculiarity of these plants is to produce a seed containing a highly nitrogenous element, called legumen. In our own experiments we find grain in the driest state contains one and two, but rarely three, per cent. of nitrogen. We find in the dry substance of clover-seed as much as seven per cent., and in beans and peas five per cent. The proportion of nitrogen in the seeds of these plants would, therefore, probably increase, within certain limits, under the influence of ammoniacal supply. The following results obtained by Dr. Gilbert seem to favour this view:—

	Per centage of Nitrogen in Dry Matter.	
	Exp. 1.	Exp. 2.
Beans grown by mineral manure	4.77	4.78
Beans grown by ammoniacal manure.	5.11	5.59

In the seeds of cruciferous plants, turnips and rape for example, a non-nitrogenous product (oil) seems to abound, and we might expect that ammoniacal manures would tend to enhance its pro-

duction in such plants, in like manner as that of starch is increased in the seeds of the gramineous family. Turnip-seed is not, however, cultivated in England with a view to its oily products, and I have only investigated the effect of ammoniacal supply upon the leaf and bulb of the plant.

In reference to the circumstances under which the formation of the special product of plants seem to be increased, a few remarks upon the cultivation of sugar-cane may not be out of place, especially as there are so many agriculturists in this country who possess properly in the West Indies, and the application of scientific principles would increase the production of sugar and reduce the expense of its cultivation to an extent not very readily imagined. Although sugar is found in almost every plant at certain periods of its growth, it is only extracted profitably from three or four, of which the cane is the most important. Sugar belongs to a class of carbonaceous substances, all of which are developed in the greatest perfection in the hottest regions. Among these are starch, gum, and oil; and although each plant possesses organs necessary to perfect its peculiar carbonaceous products, the same laws must govern the formation of them in all. In wheat I have shown that the carbonaceous product, starch, increases with a supply of ammoniacal manures, under the influence of a high temperature and the absence of rain; owing, however, to the moisture of our climate, and the want of that temperature which is required for producing and depositing starch, there are difficulties in the way of increasing this carbonaceous compound, which would not be met with if the same principles were applied to produce sugar in the cane. If I could depend upon a constant climate in England similar to that of 1846, I could produce annually 40 or 50 bushels of wheat upon an acre with the same facility that I now produce 33 or 34; but as it is, were I to supply the proportion and quantity of mineral and organic manures necessary to produce 50 bushels, in a wet and cold summer, it would unduly develop the circulating condition of the plant, its vascular structure would be increased to an injurious extent, and the crop would be laid. Those who farm very highly have often experienced this misfortune, and consequently they dread a wet summer.

To the farmer whose land is out of condition, however, a wet summer is favourable, inasmuch as it increases the supply of those elements of which his crop is in need. In the sugar-cane the carbonaceous product is required in a circulating condition; therefore those substances should be applied as manures which increase the vascular action of the plant: at the same time the soil should be rendered as dry as possible by draining. In soils where the elements of fertility exist naturally, or where they are properly supplied in the manures, the richest juice and largest amount of sugar would be produced in the driest season. In the absence, however, of the proper amount of organic matter in the soil, the vital actions of the plant would, under the same climate and circumstances, be weakened. The combustion of the cane for fuel is a process which cannot be too much condemned. It involves the necessity of a much greater outlay in manures every year; for, if the mineral matter which remains after combustion is restored at all to the soil, it is very much less efficacious than in would be if accompanied by the substance of the cane itself. In a well-regulated sugar plantation, non-nitrogenous products constitute the only export from the soil. The nitrogenous elements, which are rendered insoluble when the juice is heated, should be carefully removed, and either restored to the soil directly as manure or after being employed as food for animals.

The English farmer necessarily suffers an exhaustion of his soil from the removal of various ingredients which have not place in the constitution of sugar. In grain both nitrogen and phosphate are exported, both of which must be restored to the soil in due course. We hear of plantations which formerly produced many hundred hogsheads of sugar, now producing one-third the quantity. This can arise from nothing but exhaustion of the soil. It cannot be too generally known that the elaboration of carbon bears a very constant relation to the supply of ammonia in the manure. Every pound of sugar exported, and every pound of the cane which is burnt, involve the necessity of a supply of ammonia to the soil. Taking into consideration the immense advantage which a tropical climate affords, and the comparatively high price of the product, the cultivation of sugar offers advantages for the profitable employment of skill and capital greatly superior to any that our agriculturists can hope for. It would, however, be injudicious and improper, in defect of actual experiments, to attempt to lay down rules in detail for the application of a principle regarding which, as such, little doubt may be entertained.

I now come to the action of manures, which are generally divided into two classes—*organic* and *inorganic*. Although this distinction is by no means satisfactory, I shall adopt it asb eing generally understood. Organic manures are those which are capable of yielding to the plant, by decomposition or otherwise, organic matter—carbon, hydrogen, oxygen, and nitrogen—constituents which uncultivated plants derive originally from the atmosphere. Inorganic manures are those substances which contain the mineral ingredients, of which the ash of plants is found to consist. Much of the sub-

stances employed as manures contain both organic and inorganic substances. The greater portion of soils consist of minerals in a greater or less state of decomposition, combined with a small amount of organic matter. Every soil is capable of yielding a certain amount of vegetable produce under the influence of climate and season, without the assistance of manure: this may be called its natural produce. The proportion would vary each year, according to the amount of rain, the temperature of the season, and the description of the growing plant. It is known, however, that although the climate of any place may vary one year as compared with another, it nevertheless maintains a certain average. It may be supposed therefore that the natural produce of the soil in any particular locality would be uniform in a series of years.

The effect of rain is to dissolve a certain portion of the mineral matter of the soil: it also supplies carbonaceous matter and ammonia. Liebig found ammonia in the rain at Giessen. The rain collected in a vessel placed on the top of a tree in my wheat-field, at a distance from any building, gave, upon evaporation, a liquid having a fœted smell, and yielding ammonia to suitable re-agents. The rain collected in a rain-gauge placed in a garden at Mamhead, in Devonshire, had the taste of soot, although the wind was blowing direct from the sea during its fall. Rain is therefore capable, to a certain extent, of supplying plants with ammonia. Carbonic acid is also a constant and important constituent in rain-water, as well as in the atmosphere itself. The atmosphere may thus be considered the natural source of organic, and the soil that of inorganic, supply. It is the object of agriculture to increase the produce of the soil beyond its natural yield, which can be done by various means. The field may be fallowed—that is to say, the natural produce of the soil for two years may be concentrated into one—the repeated exposure of the soil to the atmosphere, by means of ploughing, causing a decomposition of mineral matter, while the ammonia in the rain unites with the various acids in the soil. The produce of the soil may also be increased by means of manures—that is to say, by supplying those ingredients which the soil and the atmosphere are incapable of yielding in sufficient quantity for an agricultural result. This process I shall now endeavour to explain. It will be remembered that the produce of wheat and straw upon the unmanured portion of my experimental field was greatest in the year when the atmospheric influence, and therefore the supply of ammonia, was the most; but in no case was a full agricultural crop obtained. This may be attributed to two causes: either that the wheat was incapable of assimilating what the atmosphere and rain could supply, for want of an available amount of minerals in the soil; or that the minerals in the soil were in excess, but that the wheat was incapable of assimilating them for want of a sufficient supply of ammonia, or other organic substances.

It has been argued by Liebig that the atmosphere can supply the ammonia, from which plants derive their nitrogen, in sufficient quantity for agricultural purposes; and his views on this subject have been echoed through England by a host of his followers. This point, upon which so much difference of opinion exists between the French and German chemists, is perhaps the most important to agriculture which chemistry can solve. It affects the whole economy of cultivation, and the final solution of it must materially influence the actions of all practical agriculturists. With regard to the most important crop (wheat), my own experiments are so decisive, and through the whole series the results are so uniform, that it is hardly possible to have two opinions on the subject; and, what is still more important, they are in accordance with the dictates of reason and the practical experience of agriculture. The first year's experiments were drawn out principally with the view of ascertaining how far mineral manures were capable of restoring the fertility to a soil of which it had been deprived by repeated cropping. On the space of ground which was not manured, the acreage yield was as follows:—

Grain, 16¾ bushels; straw, 1120 lbs.

This may be considered as the natural produce of the soil, subject only to the atmospheric influence of that particular season. The next experiment was with 700 lbs. of superphosphate of lime, which gave—

Grain, 16¾ bushels; straw, 1116 lbs.

The superphosphate of lime employed in these experiments was made from calcined bone only, and was therefore strictly a mineral manure. By comparing this experiment with the last, it will be seen that no increase of produce was obtained.

The effect of superphosphate of lime upon wheat has been the subject of many experiments, and in some instances it has been employed with remarkable success. It becomes therefore of importance to inquire what was the probable cause of its inutility in this instance. Besides phosphoric acid and lime, the ash of wheat and wheat-straw contains potash, magnesia, soda, and silica; and as superphosphate of lime contains none of these substances, its failure in this case may be attributed either to the absence of these minerals in the soil, or to a deficiency of azotized or other organic matter.

The average results obtained by other mineral manures are given below :*—

	Bushels of Grain.	Pounds of Straw.
Superphosphate of lime, 350 lbs.; phosphate of magnesia, 420 lbs.	16 2-10th	1100
Superphosphate of lime, 350 lbs.; phosphate of soda, 325 lbs.	16¾	1172
Superphosphate of lime, 350 lbs.; phosphate of potass, 375 lbs.	16¼	1160
Superphosphate of lime, 560 lbs.; silicate of potass, 220 lbs.	16 4-10th	1112
Superphosphate of lime, 350 lbs.; phosphate of magnesia, 210 lbs.; phosphate of soda, 162½ lbs.	16¾	1116
Superphosphate of lime, 350 lbs.; phosphate of magnesia, 210 lbs.; phosphate of potass, 187 lbs.	17½	1204
Superphosphate of lime, 350 lbs.; phosphate of magnesia, 210 lbs.; silicate of potass, 275 lbs.	17	1176
Superphosphate of lime, 350 lbs.; phosphate of magnesia, 168 lbs.; phosphate of potass, 150 lbs.; silicate of potass, 110 lbs.	17 8-10th	1240

The greatest increase obtained by these mineral manures over the natural produce of the soil was less than two bushels of wheat and 84 lbs. of straw. The effect of minerals obtained from a more natural manuring source (the combustion of dung) gave a similar result. A quantity of farm-yard dung was weighed into two portions, at the rate of 14 tons each per acre, one being burnt to ashes, and the other ploughed into the soil. The results were as under :—

	Bushels of Grain.	Pounds of Straw.
14 tons. of farm-yard dung	22	1476
Ash of 14 tons of farm-yard dung	16	1104

The absence of any agricultural increase of produce throughout this series of experiments might be said to arise either from some defect in the mineral constitution of the manures, or from the minerals in the soil not being in a proper state for the wheat to assimilate them; but if, as is seen in the following table, the addition of an ammoniacal salt can produce an increase of corn and straw to a considerable extent, the minerals must have been in a state available for the plant :—

	Bushels of Grain.	Pounds. of Straw
1. Superphosphate of lime, 635 lbs.; sulphate of ammonia, 65 lbs.	21¼	1368
2. Superphosphate of lime, 350 lbs.; phosphate of magnesia, 84 lbs.; phosphate of soda, 75 lbs.; silicate of potass, 110 lbs.; sulphate of ammonia, 65 lbs.	21¼	1480
3. Superphosphate of lime, 350 lbs.; phosphate of magnesia, 84 lbs.; phosphate of soda, 75 lbs.; silicate of potass, 110 lbs.; rape-cake, 156 lbs.	22¾	1768
4. Superphosphate of lime, 350 lbs.; phosphate of magnesia, 106 lbs.; phosphate of soda, 80 lbs.; silicate of potass, 110 lbs.; sulphate of ammonia, 80 lbs.	26¼	1772

On comparing the produce of No. 1 in this table with that of the superphosphate of lime as given elsewhere, it will be seen that the substitution of 65 lbs. of superphosphate of lime by 65 lbs. by sulphate of ammonia has caused an increase of 4½ bushels of corn, and 248 lbs. of straw. Again, the increase shown in No. 4, where 80 lbs. of sulphate of ammonia were employed, is from 8 to 9 bushels of corn, and about 600 lbs. of straw, over the produce of the best mineral conditions as given in a former table.

The evidence afforded in these experiments re-

* The terms superphosphate of lime, phosphate of potass, phosphate of soda, and phosphate of magnesia, by which it is convenient to designate the manures, are not to be understood as representing the pure chemical substances bearing those names. The composts were formed by acting upon bone-dust by means of sulphuric acid, in the first instance, in the cases of the alkaline salts and the magnesian salt, neutralizing the compounds thus obtained by means of cheap preparations of the respective bases. The silicate of potass was manufactured at a glass-house by fusing equal parts of pearl-ash and sand—a clear transparent glass, slightly deliquescent in the air, was the result; it was ground to powder under edge-stones.

garding the importance of ammoniacal manures caused us to discontinue the employment of mineral manures alone in the second year. It was highly desirable to ascertain whether the minerals supplied during the first year, and also those naturally contained in the soil, were capable of being taken up by future crops. For this purpose ammoniacal salts alone were subsequently employed on some of the plots:—

Season.	Same Space of Ground each Year.	Grain.			Straw.
		Bush.	Pks.	Qts.	Pounds.
1844	Superphosphate of lime, 560lbs.; silicate of potass, 220lbs...	16	0	0	1112
1845	Sulphate and muriate of ammonia, each 1½ cwt.	31	3	1	4266
1846	Sulphate of ammonia, 2 cwt.	27	1	2	2244

From the immense increase, both of corn and straw, obtained in the second and third years, without any fresh addition of minerals, it is evident that the deficient produce in the first year could only result from the want of some power in the plant to assimilate those already at its command, and that such a power was not wanting in the succeeding years.

I shall only notice one more set of experiments in connection with this point, and which were tried in the season of 1846 with the wheat manure patented by Professor Liebig, and prepared and sold under his name and authority. On referring to the specification of his patent, it will be seen that his object is to reduce the solubility of the alkalies by fusing them with lime and phosphate of lime, and to employ those substances which will form a compound resembling the ash of wheat:

	Grain.			Straw.
	Bush.	Pks.	Gal.	Pounds.
1. Unmanured acre	17	3	3	1513
2. 4 cwt. of Liebig's wheat manure alone	20	1	2	1676
3. 4 cwt. of Liebig's wheat manure, with 4 cwt. rape-cake	22	3	1	1968
4. 4 cwt. of Liebig's wheat manure, 1 cwt. each of sulphate and muriate of ammonia	29	0	3	2571
5. 4 cwt. of Liebig's wheat manure, 4 cwt. rape-cake, 1 cwt. each of sulphate and muriate of ammonia	31	3	0	3007

The superiority which Liebig's manure, when used alone, exhibits, as compared with the result of the unmanured space, may be attributed to its containing a small quantity of ammoniacal matter, which was distinctly perceptible to the smell.

The absolute necessity of supplying nitrogen to enable the soil to produce more wheat than it could do in a natural state, is so apparent throughout this series of experiments, that it is difficult to entertain the slightest doubt upon the subject. As long as any available ammonia exists in the soil, so long will mineral manures increase the produce of wheat. If I had commenced my experiments upon a field in high condition, full of animal and vegetable matter, I might have been some years in arriving at the true action of mineral manures: as it was, the first year almost decided the question.

For the last seven years this field has suffered an immense loss of minerals, rendered available to the plant by means of ammonia; and the produce of last year (1846) showed that the mineral condition was still little impaired. The crop now growing shows, however, symptoms of an opposite condition of soil. In some experiments, where no minerals have been supplied, the salts of ammonia are not producing their accustomed effect; an excess of the azotized condition is commencing, and mineral manures will now have to be employed to increase the natural produce of the soil.

The various contradictory results obtained by the application of mineral manures to wheat are completely accounted for when it is known that they only increase the produce in proportion to the available azotized matter existing in the soil. Although I have confined my remarks to the wheat crop, they apply equally to the whole class of plants belonging to the same "natural order." Though they do not thrive equally well in the same climate and soil, I consider them all to be plants in which the nitrogen supplied in the manure is more than what is obtained in the produce. They may for our present purpose be called nitrogen-consuming plants, in contradistinction to those which are nitrogen-collecting plants, and contain more of this substance than was supplied to them in the manure. Common pasture belongs to the same class of plants as our grain crops: hence we have an additional argument to the number already advanced, in favour of breaking it up in every case where it is not required for ornamental purposes.

The theory advanced by Liebig, that "the crops on a field diminish or increase in exact proportion to the diminution or increase of the mineral substances conveyed to it in manure," is calculated so seriously to mislead the agriculturist that it is highly important its fallacies should be generally known. The contempt which the practical farmer feels for the science of agricultural chemistry arises from the errors which have been committed by its professors. They have endeavoured to account for, and sometimes to pronounce as erroneous, the knowledge which ages of experience have established; and they have attempted to generalize without the practical data necessary to accomplish their end with success. Agriculture will eventually derive the most important assistance from chemistry; but before it can propose any changes in the established routine of the farmer, it must, by a series of laborious and costly experiments, explain this routine in a satisfactory manner.

Although the experimental results which have been detailed undoubtedly prove that to produce agricultural crops of corn nitrogen must be supplied to the soil in some form or other, two important questions still remain unanswered, namely—First, what amount of ammonia will be required to produce a given amount of corn? or, in other words, what amount of nitrogen must the farmer accumulate in his soil to obtain each bushel of corn beyond the natural produce? Secondly, what are the most economical means at his disposal for securing the necessary supply? The solution of these questions is within the reach of careful experiment and calculation; and, although any data at present at our disposal may be incompetent to a proper treatment of them, it may serve some useful purpose to apply such results as we possess with the view of directing some general and approximative knowledge on points bearing so essentially on the economy of agriculture.

It may be considered for our present purpose that a bushel of wheat contains one pound of nitrogen. It must not be supposed, however, that $1\frac{1}{3}$ lbs. of ammonia (equivalent to one pound of nitrogen) supplied to the soil, will, even under the most favourable circumstances, add a bushel to its natural produce. Throughout the whole course of my experiments upon the growth of wheat by means of ammoniacal salts, there has been a loss of nitrogen far too great to be attributed merely to drainage and evaporation from the land; and it is possible that a better knowledge than we now possess of the vital actions of plants will, sooner or later, throw much light upon this interesting and highly important phenomenon. I am inclined to think that, for practical purposes, we may assume 5 lbs. of ammonia to be required for the production of every bushel of wheat beyond the natural yield of the soil and season; at any rate, it will be useful to remember this as the amount until future experiments shall furnish further information on the subject. In the following table (pp. 115—117), are arranged some of the results obtained last year (harvest 1846) in my experimental wheat-field.

Besides the bearing which these results have upon other points than that of the amount of ammonia required to produce a bushel of corn, they will enable any one to judge of the probable exactness of the estimate which has just been made. It should be remembered, however, that as the season of 1846 was more than usually favourable to the production of corn, any calculations founded upon the results of that year might lead to an over-estimate of what the ammonia would produce in an average of years. The produce of the unmanured space and that of farm-yard dung was—

	Bush.	pks.	qrts.	Straw in lbs.
No manure....	17	3	3	1513
14 tons of dung	27	0	3	2454

It was my intention to conclude this paper with some experimental evidence relative to the influence of climate and manures upon the turnip and leguminous crops; but, having extended my observations upon the corn-plants to a greater length than I had at first contemplated, I shall defer the consideration of that subject to a future period. I wish, however, to make a few observations upon the general principles of practical agriculture. Some of them are apparent from the evidence I have already brought forward, but some of them are indicated by the results of other branches of the investigation than those which I have discussed in the foregoing pages.

I have said that soil and atmosphere are the two great natural sources from which plants derive the elements of their growth; the former supplying the inorganic and the latter the organic elements. Besides the minerals of which soils are principally composed, they contain a certain amount of organic matter capable of yielding carbon and ammonia to plants; and the annual amount of ammonia which a soil is competent to yield under the influence of the atmosphere must to a certain extent determine its natural fertility. A Russian soil, said to be one of the most fertile in the world, and which yields fine wheat without manure, gave when analyzed by M. Payen, $24\frac{1}{2}$ lbs. of nitrogen in 1000 lbs. of soil, or nearly $2\frac{1}{2}$ per cent. A very fertile soil sent to me by Sir John Tylden from Somersetshire, and said to yield 40 bushels of wheat annually without manure (a statement afterwards proved to be incorrect), was analyzed by Dr. Gilbert in my laboratory, and gave 6·2 lbs. of nitrogen in 1000, or rather more

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Selected Results of Experiments upon the Growth of Wheat by means of Artificial Man ures; 3rd Season. Harvest 1846.

Numbers.	Description of Mineral Manures—Acreage Quantities given.	Bushels, Pecks, and Quarters per Acre.				Straw per Acre in lbs.			
		The Mineral Condition only.	Mineral Condition, and 4 cwts. Rape Cake.	Mineral Condition, and 2 cwts. Ammoniacal Salts.	Mineral Condition, 4 cwts. Rape Cake, and 2 wcts. Ammoniacal Salts.	The Mineral Condition only.	Mineral Condition and 4 cwts. Rape Cake.	Mineral Condition, and 2 cwts. Ammoniacal Salts.	Mineral Condition, 4 cwts. Rape Cake, and 2 cwts. Ammoniacal Salts.
		bush. p. q.	bush. p. q.	bush. p. q.	bush. p. q.	lbs.	lbs.	lbs.	lbs.
1	2 cwts. calcined bone-dust	..	23 3 1	29 0 3	..	..	1963	2575	..
2	Ditto, ditto, and 2 cwt. hydrochloric acid	..	..	*25 3 3	*31 1 3	..	..	*2390	*2936
3	Ash of three loads wheat-straw	19 0 2	23 2 2	*27 0 0	*30 0 3	1541	1721	*2309	*2901
4	4 cwts. Liebig's manure for wheat	20 1 2	22 3 1	29 0 3	31 3 0	1676	1968	2571	3007
5	No mineral manure (exhausted land)	17 2 2	23 2 3	*27 1 2	*28 3 2	1455	2033	*2244	*2603
6	2 cwts. calcined bone-dust, 2 cwts. sulphuric acid.	..	23 1 3	30 0 1	..	..	2133	2715	..
7	Ditto, ditto, and 180 lbs. soda ash	..	24 1 2	28 2 3	..	..	2163	2554	..
8	Ditto, ditto, and 200 lbs. pearl ash	..	24 0 0	29 1 3	..	..	2327	2755	..
9	Ditto, ditto, and magnesian limestone	..	23 2 2	26 2 2	..	..	2031	2534	..
10	Ditto, ditto, and 60 lbs. soda ash, 68 lbs pearl ash and magnesian limestone	22 1 0	23 3 0	*30 2 0 31 0 0	*30 1 0 33 2 2	..	2067	*2784 2838	*2836 3278
	Mean results	19 3 2	23 2 1	28 0 0	31 0 0	1704	2045	2546	2925

* Denotes that the ammoniacal salt employed was entirely *sulphate*; in other cases, 1 cwt. *each* of sulphate and muriate were used.

It is to be regretted that, with a view to some interesting points of comparison, the same salt of ammonia was not employed throughout the entire series; the muriate containing a higher per centage of ammonia than the sulphate, its effect might be expected to be somewhat greater, and this indeed is seen to be the case. The series with Liebig's manure (besides the small amount of ammonia it itself contains) may owe its slight superiority over the straw-ash series to the one where no mineral manure was employed, partly to the use of muriate, as well as sulphate of ammonia; on the other hand, the series No. 10 has the advantage over No. 4 throughout.

Selected Results, &c.—*continued.*

Numbers.	Total Weight of Corn per Acre in lbs.				Weight of Dressed Corn per bushel.				Per Centage of Corn to Straw.			
	The Mineral Condition only.	Mineral Condition, and 4 cwts. Rape Cake.	Mineral Condition, and 2 cwts. Ammoniacal Salts.	Mineral Condition, 4 cwts. Rape Cake, and 2 cwts. Ammoniacal Salts.	The Mineral Condition only.	Mineral Condition, and 4 cwts. Rape Cake.	Mineral Condition, and 2 cwts. Ammoniacal Salts.	Mineral Condition, 4 cwts. Rape Cake, and 2 cwts. Ammoniacal Salts.	The Mineral Condition only.	Mineral Condition. and 4 cwts. Rape Cake.	Mineral Condition, and 2 cwts. Ammoniacal Salts.	Mineral Condition, 4 cwts. Rape Cake, and 2 cwts. Ammoniacal Salts.
	lbs.	lbs.	lbs.	lbs.	bush.	bush.	bush.					
1	..	1549	1988	..	..	63.5	63.6	..	..	78.9	77.2	..
2	..	..	*1777	*2112	..	..	*63.5	*62.5	..	..	*74.3	*71.9
3	1305	1598	*1827	*2076	63.7	63.4	*63.0	*63.3	84.6	92.8	*79.1	*71.6
4	1400	1534	1967	2163	63.7	63.0	63.5	63.4	83.6	77.9	76.5	72.6
5	1216	1614	*1850	*1942	63.8	63.5	*63.6	* 3.3	83.6	79.4	*82.4	*74.6
6	..	1628	2055	..	..	63.3	63.2	..	..	76.3	75.7	..
7	..	1661	1955	..	..	63.0	63.4	..	..	76.8	76.5	..
8	..	1660	1998	..	..	63.5	63.2	..	..	71.3	72.5	..
9	..	1605	*1812	2019	..	63.0	63.4	..	..	97.0	*71.5	..
10	1474	1592	2048	2241	62.0	62.0	{ *63.0 62.75 }	{ *62.7 62.8 }	77.1	77.0	{ *70.3 72.2 }	{ *71.2 68.3
	1349	1605	1753	2092	63.3	63.1	63.3	63.0	82.2	78.8	76.2	71.7

Selected Results, &c.—*continued.*

No.	Increase in Corn by Manure.				Increase in Straw by Manure.				Increase in Total Produce by Manure.			
	The Mineral Condition only.	Mineral Condition, and 4 cwts. Rape Cake.	Mineral Condition, and 2 cwts. Ammoniacal Salts.	Mineral Condition, 4 cwts. Rape Cake, and 2 cwts. Ammoniacal Salts.	The Mineral Condition only.	Mineral Condition, and 4 cwts. Rape Cake.	Mineral Condition, and 2 cwts. Ammoniacal Salts.	Mineral Condition, 4 cwts. Rape Cake, and 2 cwts. Ammoniacal Salts.	The Mineral Condition only.	Mineral Condition, and 4 cwts. Rape Cake.	Mineral Condition, and 2 cwts. Ammoniacal Salts.	Mineral Condition, 4 cwts. Rape cake, and 2 cwts. Ammoniacal Salts.
1	..	342	781	..	..	450	1062	..	..	792	1843	..
2	..	..	*570	*905	..	..	*877	*1423	..	..	*1447	*2328
3	97	391	*620	*869	28	208	*796	*1388	125	599	*1416	*2257
4	193	327	760	956	163	405	1058	1494	356	732	1818	2450
5	..	407	*643	*735	..	520	*731	*1090	..	927	*1374	*1825
6	..	421	848	..	..	620	1202	..	..	1041	2050	..
7	..	454	748	..	..	650	1041	..	..	1104	1789	..
8	..	453	791	..	..	814	1242	..	..	1267	2033	..
9	..	398	605	..	..	518	1021	..	..	916	1626	..
10	267	385	{ *827 841 }	{ *812 1034 }	380	554	{ *1270 1325 }	{ *1323 1765 }	647	939	2166	2799
	183	397	721	885	190	526	1020	1420	343	924		

The acreage produce, as will be seen by inspection, is arranged in four columns, and the manures, the detail of which is given on the left of the figures, were used alone, or with additions, as indicated by the several headings. The effects of the different mineral manures, whether alone or with artificial supply of organic constituents, are thus readily seen by casting the eye *down* each column; and those of different conditions of organic with the same mineral supply are found in a line *across* the four columns.

than ½ per cent.; whilst from the soil of my experimental field, which yields about 17 bushels of wheat annually without manure, he obtained in 1000 parts only 2·0 of nitrogen, equal to 1-5th per cent. Although the amount of nitrogen in a soil, independently of any immediate supply, may determine to a certain extent its powers of producing corn, it is not a sure criterion of the value of different descriptions of soil. The rich clayey soils, in which the largest stores of nitrogen are generally found, are exactly those which derive the least benefit from a rotation of crops. The amount of nitrogen existing in a sandy soil may hardly be appreciable by analysis; but by the free circulation of air through its pores, the accumulation from the resources of the atmosphere through the medium of green crops, and especially of turnips, to a certain extent counterbalances the deficiency. The actual value of a turnip crop must vary very much according to the texture of the soil. On heavy clays, the decomposition of soil by means of a summer-fallow aided by lime, will often render available more ammonia as well as mineral mixtures, than could be obtained by means of a turnip-crop. Upon light soils, however, nothing can advantageously substitute the collective powers of the turnip. In one soil the accumulation of available stores may be effected by combustion or lime, in the other they must be supplied by a different process. As almost every soil contains mineral matter in an undecomposed state, it must evidently be advantageous to favour its liberation by every possible means; for the more produce a soil can be made to yield without manure, the less manure it will require to being its produce up to a maximum. It was at one time supposed that by repeatedly hoeing and stirring the soil, it could be made to yield perpetual crops without manure; and although this was carrying the principle too far, it undoubtedly proves the benefit of mechanical operations. Draining, however, offers advantages to the agriculturist superior to any as a means of obtaining the influence of the atmosphere upon the soil. Not only is the surface of the soil exposed to the action of the air, but its influence extends to the depth of the drains themselves. In addition to this advantage, what may be considered as an artificial climate is to some extent obtained. An increased temperature, and the absence of moisture, conditions so essential to the production of grain of fine quality, are the result of draining the soil. Thermometers placed in two soils equally exposed to the sun's rays, one of which is moist and the other dry, indicate very different degrees of temperature. The rays of the sun, which only serve to evaporate moisture in the one, will raise the temperature of the other. It follows that plants would grow more rapidly upon a well-drained soil than upon one in an opposite condition, especially during the spring. It will be remembered how large a quantity of ammonia I found it necessary to supply to my soil each year to restore the substances removed in the previous crop. Besides being expensive, this ammonia cannot be procured in the market in any large quantities; but by cultivating turnips and the leguminous plants, a large amount of this substance is collected by them from the atmosphere. A rotation of crops may in one sense therefore be considered as an economical process for obtaining ammonia; but as the amount obtained by green crops must depend very much upon their bulk, every attention should be paid to their growth. In order to produce the greatest weight of turnips, it is necessary that the soil should be brought to the finest and lightest condition possible by mechanical means, and that it should be manured by a large and available supply of carbon and phosphates. Ammonia artificially supplied is not essential if the soil be not deficient in carbonaceous substances; and where the phosphates are not supplied in sufficient quantity, it exerts a most injurious effect upon the plant.

The turnip is essentially a plant which requires artificial aid for its development in agricultural quality and quantity. It is singular that while my soil yields 17 bushels of wheat annually without manure, the turnips upon an unmanured space were reduced to a few cwt. per acre in three years, and in the fourth only averaged the size of a radish. It is also remarkable that a plant whose office it is to restore fertility to the soil should scarcely be able to exist where wheat was yielding a tolerable crop; but the different effect produced upon two crops by farm-yard dung and superphosphate of lime at once explains this anomaly. Eighty-four tons of farm-yard dung, consisting of decaying straw mixed with the excrement of the farm-horses, applied to one acre of wheat and one of turnips during three years, at the rate of 14 tons per acre per annum, did not, in the acre of wheat, add much more than one-half to the natural produce each year: the turnips, however, were increased to an indefinite extent. Superphosphate of lime, which produced no increase of wheat the first year it was applied, gave in succession three good crops of turnips. The dung which I applied to my wheat increased the produce to an extent equivalent to the amount of ammonia which it may be estimated to contain; but it is evident that the great bulk of 42 tons served little useful purpose, for we find that salts of ammonia have produced each year a larger amount of corn. The whole of the solid matter of the residue, consisting of organic matter almost destitute of nitrogen, could have been assimilated by the turnip, under the influence of a due supply of phosphates.

On poor soils it is quite consistent with scientific principles to employ rich azotized dung for the wheat crop, and to convert the carbonaceous residue into the substance of the turnip by an abundance of phosphates. It would, however, probably be advantageous to have a greater proportion than one-fourth of the farm under turnips each year. At present, upon the Norfolk system, one-fourth of the farm is clover, but broad clover cannot be obtained with certainty so often. If instead of this, one-eighth of a farm was clover and three-eighths turnips, a larger proportion of winter food would be obtained, and as much clover grown upon an eighth as has hitherto been grown upon one-fourth of the farm. We have no reason to suppose that one grain crop possesses the power of exhausting the soil more than another. The tenant-farmer should therefore be permitted to grow that crop which is most suited to his soil. On the heavy soils alternate wheat crops might be grown; oats might also be substituted for barley with advantage, whenever the soil has been rendered incapable of complete pulverization, by consuming the turnips upon the land in wet weather.

Having, I trust, shown upon scientific principles that a rotation of crops is indispensable in order to carry out a system of practical and economical agriculture, I shall now endeavour to prove by a few brief observations that to obtain the greatest possible produce from the soil, the production of meat ought to bear a definite relation to the amount of grain exported.

The philosophical considerations to which this subject naturally leads are of the highest interest; but as it would be impossible to treat of them at once clearly and at the same time as briefly as our present object permits, it will be best to turn our attention to some of the more practical bearings of the question.

In feeding stock but a small proportion of the nitrogen in the food is converted into the substance of the animal; the greater portion is restored to the soil as manure. The economy of the production of meat as a means of obtaining manure arises from the greatly increased value of the nitrogen in flesh, as compared with that supplied in the food. Thus 28 lbs. of flesh, worth 14s., contains 1 lb. of nitrogen—28 lbs. of peas, beans, or oil-cake, which contain about the same quantity, are not worth more than 2s. or 3s. To determine the exact proportion of the meat, or rather the live weight of stock, which must be produced upon any farm to obtain the greatest possible produce of grain, requires a long and careful series of investigation.

With the exception of one experiment performed by Boussingault, we have no data from which we can calculate the loss of carbon and nitrogen which a farm sustains by the vital processes of the animals fed upon it, but it is evident that it is most serious. In Boussingault's experiments it appeared that a cow respired in 24 hours as much dry organic matter as was equivalent to 100 lbs. of turnips. This forms a strong argument in favour of the modern system of fattening animals rapidly by means of artificial food. When turnips are plentiful and stock is dear, farmers not unfrequently give their turnips to any person who will bring stock to consume them. And it is a common practice in some places to feed a quantity of half-starved cattle upon straw for the purpose of converting it into dung. It should, however, be understood that the passage of the straw or turnip through the stomach of the animal, far from adding to the quality of these substances as manure, abstracts a large proportion of their valuable elements. There is no magical property in the black mass called dung which did not exist in the straw. Some of the elements may be rendered more rapidly available by the decomposing agency of the animal; but the actual quantity restored to the soil must be considerably reduced. In all cases, therefore, where artificial food is not employed, or when the consumption of food is not attended with profit, it is better to restore the superabundance of green crop more directly to the soil for the after-growth of corn; whilst any residue of our corn crops, if it cannot be used as litter, will, if returned to the soil in its natural state, or after suffering decomposition between layers of earth, supply constituents to the succeeding fallow crop.

The increase of meat obtained by any particular food must vary to a certain extent, with animals of different breeds and ages, as well as with the care and attention bestowed upon them. There is, however, in all cases, a relation sufficiently evident between the increase of the animal and the nitrogen in the food, to enable us to form some calculation upon the relation which should exist between the production of corn and that of meat upon a well cultivated farm. In illustration of this statement, in the first place I may refer to some experiments made upon the farm of the Earl of Radnor, regarding the feeding qualities of different breeds of sheep. The results are quoted from vol. vii., part ii., of the Journal.

In the first experiment, 20 sheep received 847 lbs. of hay, 1319 lbs. pulse, and 25,293 lbs. swedes, and the increase of live weight was 400 lbs. In the second experiment 1044 lbs. of hay and 17,254 lbs. of turnips produced 192 lbs. of meat. Calculating the nitrogen consumed by the first lot to be in the hay 8½ lbs., in the pulse 45 lbs., in the turnips 38 lbs., and taking the per centage of nitrogen in the increase of live weight at 3½, we have in the first experiment—

91½ lbs. of nitrogen supplied in the food.
14 lbs. do. converted into flesh.

Upon similar calculations the second experiment gives—

35 lbs. of nitrogen supplied in the food.
7 lbs. do. converted into flesh.

In the first experiment 1 lb. of nitrogen produced 4⅓ lbs. increase of flesh, and in the second 1 lb. of nitrogen produced 5 lbs. increase; not making any allowance for the probable loss by the vital processes of the animals and in the preparation of the dung, we have, for each pound of nitrogen exported, as much in the first experiment as 6½ lbs., and in the second 5 lbs. remaining for manure.

In the "Gardener's Chronicle," for the year 1844, are given the results of some experiments upon feeding sheep conducted upon the farm of Earl Ducie, by Mr. Morton; some of these sheep were fed in the field, some under cover. Altogether 25 sheep were experimented upon, and they increased 611 lbs., having consumed 31,580 lbs. of swedes, 2775 lbs. of oats. Calculating the food to have contained 95 lbs. of nitrogen, and the increase of live weight to represent 21 lbs. of nitrogen, 1 lb. of nitrogen produced 6½ lbs. of live weight, and for each pound of nitrogen exported in meat 3½ remain for manure.

In an experiment of my own, two pigs, which consumed food containing by analysis 12½ lbs. of nitrogen, increased in weight 71 lbs. This gives about 5¾ lbs. increased live weight, and for every pound of nitrogen exported in meat, and about 4 lbs. remain for manure.

In Bacon's Essay on the agriculture of Norfolk, there is a table of the feeding qualities of oil-cake and swedes, compared with a compound of boiled linseed with peas and swedes; six oxen were selected for each trial, and the live weight of each beast was taken at the commencement and the end of the experiments.

The following are the results :—

1.—6 oxen consumed 106,792 lbs. turnips, 3,712 lbs. peas, 1,110 lbs. linseed.
The increase of the live weight being 1,722 lbs.
2.—6 oxen consumed 108,440 lbs. turnips, and 6,183 lbs. oil-cake.
The increase of the live weight being 1,310 lbs.

In the first lot the nitrogen in the food was about 335 lbs., 1 lb. of nitrogen gave 5 lbs. of increase live weight, and for each pound of nitrogen exported 4⅓ lbs. remained for manure.

In the second lot, the nitrogen in the food was 389 lbs., 1 lb. of nitrogen gave 3 4-10th increase, and for each pound of nitrogen exported 7½ remain for manure.

In consequence of turnips being employed as part of the food in all the results which I have given, it is impossible to make any calculation respecting the economy arising from fatting cattle as a means of obtaining manure, without first deciding at what expense turnips can be produced. Upon this subject very great difference of opinion exists amongst agriculturists, and indeed the effects of soil and season so materially affect the question, that it is scarcely safe to make any calculations respecting it. Some would value them as low as 7s. per ton, some as high as 20s.

By the kindness of a friend, however, I have been provided with some results obtained by feeding upon marketable food alone. As the results extend over a considerable number of years, in each of which 30 to 40 oxen were fatted, they may be considered to afford very trustworthy information on the subject.

Each ox received for 22 weeks 20 lbs. of the best clover hay, and 10 lbs. of English oil-cake per day. They sold for £9 more than they cost, and the average loss upon each was £4 12s.

Each ox received 3080 lbs. of hay=nitrogen	49 lbs.
1470 lbs. oil-cake do.	70 lbs.
Total nitrogen	119 lbs

Estimating the increase in live weight according to the increase in money value at 576 lbs., and the nitrogen to amount to 3½ per cent. of their weight, we have 20 lbs. of nitrogen in the meat.

1 lb. of nitrogen gives nearly 5 lbs. of increase live weight, and for each pound of nitrogen exported 5 lbs. remain for manure.

99 lbs. of nitrogen remaining for manure are equivalent to 120 lbs. of ammonia.

To supply the 120 lbs. of ammonia in Peruvian guano of average quality, it would certainly require more than half a ton of that manure, which at the present time would cost £5. The price of ammonia thus obtained would be 10d. per lb.

In my experiments upon wheat, it required 5 lbs. of ammonia to produce a bushel of corn. To obtain this amount of ammonia by means of stock, there should be an increase of about 28 lbs. of live weight upon the farm; or in round numbers, to obtain one ton of grain beyond the natural production of the soil, there ought to be an increase in the weight of stock of 1000 lbs. In order to bring an exhausted soil to the highest state of fertility, it will be necessary to produce an amount of meat by means of imported food (such as hay and oil-cake) as will be equivalent to the increase of grain required. As the green crops increase year by year, the same amount of meat will be produced; but the importation of artificial food will gradually decrease to the point at which the internal and external resources of the farm are so balanced as to secure the largest amount of produce from the soil.

I have not tried the comparative feeding qualities of the leaf and the bulb of the turnip; but from the much higher per centage of nitrogen in the former, has determined by analyses in my laboratory, it may be inferred that it is much more nutritive. This would be the case more particularly with the late-sown turnips, when the circulation of the fluids in the leaf is still active, and the plant has not had time to produce a full-sized bulb. It is possible, however, that the relatively low state of elaboration of the constituents of the leaf might interfere with its otherwise evident applicability as a healthy food.

According to the rule which has been assumed—namely, that the production of 1000 lbs. of live weight increases the yield of grain by 2240 lbs.—the production of 576 lbs. of live weight, as in the cases of the oxen cited above, would give 1290 lbs. increase in grain, equal to 21 bushels of wheat.

This method of fattening bullocks may be considered as the most expensive the farmer can adopt. The whole of the food employed (hay and oil-cake) may be viewed as manufactured articles: it is evident, nevertheless, that artificial manures would have been a dearer source of ammonia than that afforded by the feeding of the animals; but when the other constituents of the several manures are taken into account, the balance will be still more in favour of the fatting process. The dry matter contained in the food of the ox was nearly 4000 lbs.; and of this quantity, deducting the little that was converted into the substance of the animal, the only remaining reduction, if the dung be properly manufactured, is in the carbon respired by the animal, which, under the system of agriculture here advocated, is a consideration of no moment. It may appear to some agriculturists that I have entered into details on this subject which are both tedious and unnecessary, but I would solicit a careful consideration of them. I do not at all imagine that the precise relations of ammonia to increase of corn, and of nitrogen in food to nitrogen of live weight obtained, are really such as have been assumed for the purposes of illustrating the views advocated in this paper. My object is to establish as a principle, by which practical agriculture should be guided, that the amount of meat or live weight of stock produced upon a farm should bear a fixed relation to the quantity of corn exported.

If the truth of this postulate be once established, and the proper proportions fixed, it will no longer be necessary to enforce upon the farmer any particular rotation of crops. So long as a due relation between his production of meat and export of corn were maintained, there would be no fear of an exhaustion of the soil, even if he grows no green crops whatever; and he might safely be left to make his own choice of the means he would adopt. His object being the production of a certain amount of meat at the lowest possible expense, he would naturally devote his energies to the production of large green crops, in order to limit his outlay in artificial food. Knowing, too, the most profitable conditions upon which his corn could be raised, his chief attention would be paid to the economical supply of food for his stock, in full confidence as to the consequences of his course. In objection to any rule which may assume a necessary relation between the production of meat and that of corn, it may be maintained that were any cheap and inexhaustible source of ammonia discovered, the production of meat, as the means of exporting corn, should be materially lessened. The difficulties, however, which we may fairly calculate upon as standing in the way of such a consummation, as well as the physiological and commercial considerations which would be involved in its influence, are such that we need not now anticipate the result. Again, the supposition that the artificial manures at present at our command might, if directly applied to the growth of corn, be adequate to its sufficient production throughout the country, without the aid of green crops in feeding, is satisfactorily met by such calculations as the following:—The county of Norfolk is said to comprise 1,338,880 acres of land: suppose one-half of this to be cultivated on the four-course system, 334,720 acres will be under corn every year. I believe it will not be considered an exaggeration to say that cultivation in this county has increased the natural produce of corn by ten bushels per acre; and according to my calculations, it would require something like 50 lbs. of ammonia to be supplied in any artificial manure to produce this increase of corn; and considering one ton of Peruvian guano to contain 224 lbs. of ammonia, it would require an importation of 74,714 tons to supply the necessary amount for one year. This calculation affords some idea of the value of a rotation of crops.

It is not very difficult to arrive at a correct knowledge of the action and value of artificial manures. They are generally composed of two or three ingredients in a state of concentration, and are far more rapid in their action upon plants than the manure which is produced by animals. They can therefore be applied with greater success to those crops which are required in an artificial condition, and the growth of which cannot be too vigorous.

If there be any truth in my experiments, all hope of obtaining annual crops of corn by means of mineral manures must be for ever abandoned. The employment of potash, soda, magnesia, and silica, has been suggested by chemists, from an imperfect

knowledge of practical agriculture. Having found these substances in the ash of the plants, they have concluded that the soil cannot supply them in sufficient quantity. I could bring forward a great number of experiments, tried at my suggestion upon various soils, which would prove that alkaline manures were quite incompetent to remedy the exhaustion from which they suffered; but the general practice of the best agriculturists is more convincing than a thousand such experiments. Take the case of a soil which has been in the hands of a farmer who has removed from his land successive grain crops, and who has also sold part of his straw and hay, bringing back perhaps a little soot, or some light manure. This system would exhaust the soil of its alkalies to the greatest extent possible. Should it then come into the possession of a man of capital and experience, he may in a few years bring it into high condition without imparting to it a pound of potash or soda, though the course he would probably adopt would indirectly increase the available sources of those substances.

The quantity of alkalies taken up from the soil by a crop of turnips is very great, and yet the artificial manures most commonly applied to grow these turnips contain but little and often no alkalies whatever. As long as bone-dust, superphosphate of lime, or guano, will produce a good crop of turnips, the farmer need be under no apprehension of his soil being destitute of alkalies. The only mineral which, under a proper system of agriculture, it is necessary to restore directly to the soil, is phosphate of lime. Where large breeding flocks are kept, the phosphate of lime exported in the bone of the animal is very great, and many soils are incapable of yielding this in sufficient quantity. Previously to the introduction of guano into this country, large quantities of nitrate of potass and soda were employed as manures. Their value was, by many persons, attributed to the alkalies they contained; but the almost universal substitution of guano shows very clearly that the potash and soda were not the constituents to which their effects were due. At one time I thought it probable that the silicates of potash or soda might prove of some service to grain plants, but repeated experiments with these substances have caused me to alter my opinion.

The strength of the straw in grain crops seems to depend upon a healthy condition of the plant, arising from a properly balanced supply of mineral and organic constituents, as well as upon the influence of certain physical conditions of soil, especially during the early stages of growth. Thick sowing, a cold wet summer, and excess of ammonia, are all injurious to the strength of straw.

Unless straw is sold, there is a constant accumulation of silicate of potash upon farms, arising from the annual decomposition of the soil; and upon some farms the production of straw increases to an injurious extent. It is a common opinion, that artificial manures act as stimulants, and that the continual employment of them tends to exhaust the soil. This idea is to a certain extent correct; and where they are used injudiciously (as, for instance, when a mineral manure is employed upon corn crops) it would lead to such a result. But if they are employed to increase those crops which are consumed upon the farm, such as turnips and clover, they then become valuable aids to the natural resources of the farmer.

To obtain agricultural crops of clover, tares, and turnips, purely artificial conditions of growth, quite at variance with the natural tendency of the plant, are induced: and it is well known that the crop of clover which will yield the most hay is by no means that which would be selected for seed. These conditions are secured by an artificial supply of certain elements favouring the desired determinations of the plant; and therefore artificial manures may for such purpose be employed with advantage.

If grain crops, as I have endeavoured to show, can be grown at a cheaper rate by the production of meat, than by the direct action of artificial manures, the propriety of adopting the former course to its full extent becomes simply a question of capital. It would require five times as much capital to produce the same amount of corn by means of stock as could be produced by artificial manures. It is the same with the manufacturer who employs a high-pressure or a double-cylinder engine: with the former his capital invested is small, but the interest paid upon it, by the daily consumption of fuel, is very great; while with the latter his invested capital is large, and his daily interest comparatively small. The want of sufficient capital among so large a portion of our agriculturists cannot be sufficiently deplored in a national point of view. They imagine that the greater extent of land they can farm with a limited capital, the greater will be the interest obtained for it; by which means the amount of labour employed is reduced to the smallest possible extent. High prices have hitherto allowed a system of agriculture to be pursued, by which little more than the natural produce is obtained from the soil. But if the average price of corn should ever be reduced to the standard of other countries, a reduction of rent must take place equivalent to this diminution, or the decrease in the value of corn must be balanced by an increased average produced in the soil.—Journal of the Royal Agricultural Society.

NORTON FARMERS' CLUB.

The monthly meeting of this club for the promotion of agricultural improvements was held in their room, at the Bagshawe Arms, on Monday evening, November 15th. W. J. Bagshawe, Esq., presided. Mr. Lee, farmer, of Beauchieff, and Mr. Benjamin Twigg, bailiff to T. B. Holy, Esq., were elected members of the club. After the appointment of a committee to examine and report on the state of the society's proceedings, &c., T. B. Holy, Esq., gave an account of several experiments he had tried in the growth of potatoes. He produced a sample of seed raised from the lemon kidney potato, in 1846, and also a specimen of potatoes raised from the same seed during the year 1847. It was stated that the tubers which produced the seed in 1846 were tainted with disease, while the roots, which produced no apples at all, were perfectly sound. This fact was remarked as being very extraordinary. The potatoes which had been raised from the seed last season were also evidently affected by the same malady. They were about the size of almonds. Another experiment tried by Mr. Holy was, that he had been induced by some account he had seen in print, to dip the sets of potatoes, before planting, into water heated to 135 degrees, in order to destroy any latent disease which they might contain. The result was that at least three-fourths of the potatoes thus treated rotted in the ground, and the remainder were dug up and laid aside as worthless. Other experiments, however, had proved more satisfactory. In October, 1846, kidney and other potatoes were planted in beds, and during the following months, up to June 1847, the planting was continued at favourable periods. The beds were four feet wide, and the soil was thrown up about 18 inches in trenches, each bed containing three rows. Mr. Holy remarked that care had been taken to keep the potatoes grown in each month separate, and those planted in the months of October, November, and December had produced large and sound potatoes, while those planted from January to June were more or less tainted with the disease, each succeeding crop being in a worse state than its predecessor. All the sets were alike sound when planted, and some of them had cost as much as 30s. per load. At least one-third of those planted since Christmas were nearly decayed, and the decomposition was still going on. Mr. Holy considered the experiment was conclusive evidence in favour of autumn planting. The President said he thought the recommendation to plant in autumn was deserving of attention; and, at his request, each member gave an account of their crops, both at the time of reaping and at the present moment. With one or two exceptions, all the reports were alike, namely, that the potatoes appeared sound when gathered, but that some had subsequently shown evident signs of disease. Mr. Bunting said that his crop, planted in the spring, was good. Previous to planting the Irish cups, which turned out the most productive, he cut the ends off, and he found the latter to yield fully as well as the larger sets. Mr. Rogers said that his crop was comparatively free from disease. A few of the short-top reds were affected, but the regents, natives, and lemon kidneys were as good as could be desired. At the suggestion of Mr. Nelson, Mr. Rogers explained his plan of setting potatoes. The ridges were drawn a yard apart, and the sets were placed from eight to nine inches asunder. The produce had been abundant and excellent. The President said that his own crop was good. He understood that the potatoes at the union poorhouse were of a very superior character, the probable value of which, he had no doubt, would amount to five or six hundred pounds. The tillage used on the four acres where they were grown consisted of liquid manures preserved on the premises, and which no one would buy when offered some time ago for sale. The liquid was laid on the land during winter, and the ground was worked by inmates of the house. He did not know the precise state of the potatoes at the present time, but he was sure Mr. Yeomans, the governor, would give any information on the subject any one might require. After other conversation on various matters, and the inspection of samples of potatoes, and also Swede turnips grown from Bingley's guano and night soil, Mr. C. W. Bingley was called upon to read his promised paper on

CHEMISTRY APPLIED TO PRODUCTIVE FARMING.

Mr. Bingley: In resuming the series of papers on chemistry applied to productive farming, I must remind you that my last subject was on farm-yard manure. On that occasion, I pointed out to you what I conceived to be the best mode of collecting, keeping, and managing the heaps previous to using it, to promote a proper decomposition of its component parts, and to prevent as little loss as possible of the ammoniacal properties formed during the decomposition; and if any one who then heard my remarks on that head has derived any benefit

therefrom, I shall consider it as pretty conclusive evidence that the farmers may derive good from such meetings as the present, notwithstanding the observations of *The Times* newspaper, or the ridicule of *Punch*. However, to resume. The question that next suggests itself is, After having got the article, how must we make the best use of it? because, all our care in the manufacture of it may be useless, if we misapply or waste it afterwards. The sources from which farm-yard dung is obtained, and its general composition, are pretty well known to you. Its chemical composition may be said, taking the analysis of a good sample, to contain, in every ton, of nitrogen, the source of ammonia, 11lbs.; potash, 2lbs. 4oz.; soda, 1lb. 10oz.; phosphoric acid, 5lbs. 1oz.; sulphuric acid, 1lb. 4oz.; chlorine, 1lb. 9oz., besides the alkaline and calcareous bases in combination with the phosphoric and sulphuric acid, forming sulphates and phosphates. If, therefore, a farmer could only make on his own farm a sufficient quantity, the conclusion to be drawn from this analysis is, that he could not possibly have one so nearly approaching to a perfect manure, provided the soil be brought into a proper condition to afford the supply of mineral constituents required by the organs of the plant, and which the soil generally contains in a natural state in greater or less quantities. The free use of lime materially assists in bringing about this condition, by exerting a chemical action which at some future meeting I may explain; and so important is this, that in soils like those in this immediate neighbourhood, where lime does not naturally exist, if it was not artificially supplied, manures containing much ammonia would become useless, and even injurious, by constant application. Fallows, and a rotation of crops, form another means to effect this object, but I cannot at present do more than allude to the fact. The question I would now more immediately draw your attention to is—What is the best state that farm-yard manure should be in when applied to the land? This I conceive to be an important inquiry, and one which I may say science would require the helping hand of practice to answer. I shall be glad to hear the question discussed this evening amongst you; for although I may adduce theories, and give you my assistance as far as my knowledge of chemistry may enable me, yet I may err in my opinions, and it is a case where the evidence of actual practice may afford the safest conclusion. Much has been said and written upon the subject of the state the manure should be in when applied to the land, some advising its being in a perfectly rotten state, while others advocate the very opposite extreme, by using it in a state of litter. I will, however, give you my opinion, and then leave the question in your hands for discussion. In the first place, with regard to the state it should be in when applied, it appears to me to be the most in accordance with a correct philosophical principle, that a proper and well-conducted decomposition should have taken place, and that when that is over, and the heat caused thereby subsided, it will be in the best condition to answer the purpose of an efficient tillage; it will then be that the manure will contain the greatest per centage of ammonia. I have in a previous paper informed you how ammonia becomes generated—that it is during the decomposition of animal and vegetable substances—which is in other words and in fact a slow combustion going forward, at a lower temperature than where we see flame evolved. This is caused by the affinity of these substances for oxygen, the supporter of combustion; and when the substances are placed in a favourable position, the process commences. I gave you, in a former paper, in speaking of this subject, by way of illustration, the case of a lighted candle—this is precisely similar in chemical effect to the decomposition of the manure heap, except that in one the process is carried on rapidly, and the candle is consumed; in the other, it is slow, and under a lower temperature of heat, and that, consequently, the entire combustion is not completed, though, let me remind you, that if the middens are mismanaged, the combustion may be so rapidly increased, that for any further good to be derived from them, they might as well be consumed as the candle. To repeat the illustration of the candle, in which we have combustion going on rapidly—in examining this flame, a difference in the appearance of its several parts is plainly perceptible; the part next the tallow gives out but little light, and is blue, while the upper part is strongly luminous. The hydrogen combines first with the oxygen at the bottom, while the carbon is burning at the top. Now, here we have everything favourable for a rapid and entire combustion, because there is a plentiful supply of oxygen, and the greater the supply of oxygen the more rapid the combustion. But now let us limit the supply of oxygen, which we can do by reducing the size of the flame, and the result is, the combustion is less rapid; the hydrogen, from its greater affinity for oxygen than carbon, will be consumed first, whilst the carbon remaining unconsumed for want of oxygen, is deposited, and is then to be seen in the form of soot: at this instant, too, the nitrogen of the atmosphere immediately combines with the unconsumed hydrogen emitted at the time of combustion in combination with carbonic acid, and forms ammonia, the very thing we want. To those unacquainted with chemistry, it may perhaps appear strange to conceive that ammonia has been formed by me

now; but such is the fact, and the quantity is increased in proportion as the supply to a certain extent is limited. The soot in our chimneys contains a very large proportion of ammonia; but here frequently another chemical action takes place that does not ensue in the combustion of other bodies; owing to the sulphurous nature of coal, the ammonia here becomes converted into a sulphate of ammonia. I have here a small sample of some I obtained from rather less than a pint of soot. Now, this will also explain the fact why coal soot is the best the farmer can have; and I may further tell you, that where the inferior coals are burnt—those, I mean, that contain the largest proportion of dross, or pyrites (sulphate of iron)—the best kind of soot is obtained, as containing the larger proportion of ammonia in a less volatile form, from its combination with sulphuric acid, than where it would otherwise exist as a carbonate, which is exceedingly volatile. We will, however, substitute the midden for the candle, composed of, besides the inorganic elements which enter into the organization of plants, the organic elements of carbon, 52.5; hydrogen, 5.2; oxygen, 42.3. Now, I take this analysis of the organic constituents at the time when the manure is perfectly fresh. We put a quantity together, and then the process of combustion ensues; and in the same manner as in the case of our candle, is ammonia, in the form of a carbonate of ammonia, generated. It ought, therefore, to be our object to obtain as much of this as possible; that manure which contains the largest proportion is the best. It is, however, of a very volatile nature; and if the combustion of the heap is too much accelerated, *i.e.*, if too great a supply of atmospheric air (or the oxygen in the air) be admitted, by not keeping it sufficiently compressed, a great loss ensues. This may be somewhat prevented by the addition of such substances to the heap as will convert the carbonate of ammonia into a less volatile salt. But at all events, I should say that as soon as the process was completed, and the heap cool, the manure would then be in the best condition for use as a tillage. By letting it remain till perfectly rotten, a less per centage of ammonia is obtained from loss; while on the other hand, by putting it on fresh, and before the fermenting process has commenced, or only partially so, there is but a small supply of the ammonia present to lose. It is quite true the same process as that which goes on in the midden will take place sooner or later (and quicker or slower, according to the nature of the soil) after it gets applied; but it will require time, and possibly a second crop will give stronger evidence of its existence than the first; but in these times a farmer must look for quick returns, which he would fail in obtaining by adopting this course.

As to the Application of Manure.

The next question will be, whether the manure sustains any injury by being spread out upon the fallows some time previous to ploughing it in. On this I would say that in a hot, dry season, it most decidedly does suffer. But I would again call your attention to the fact, that the manure from a well-managed midden will suffer materially less than one that has not been equally taken care of. I should lay it down as a rule, that the farmer ought in all cases to spread his manure out of the cart on the land, and, in the case of fallows, plough it in as soon as he possibly can do so afterwards. The shooting it out into heaps, and there leaving it for some time, to wait the opportunity of being spread, is the worst plan that can be pursued. A further decomposition takes place in these heaps, and much valuable matter goes to waste to a much greater extent than if the parts lay disintegrated, although they may be at the same time exposed to the action of sun and wind. Again, if the weather happen to be wet whilst the manure lies in these small heaps, all the soluble parts of the manure are washed down into the ground immediately about the heaps, which causes an unequal distribution of them to the rest of the field. I may here take occasion to mention another circumstance which has struck me with reference to preparing fallows for seed, particularly turnip fallows. Though it does not exactly refer to our immediate subject, it is, that although we may not have any control over climate, we might, in a variety of ways, prevent much of the injury caused by unfavourable weather for our operations, if we cannot obviate the difficulty altogether. For one instance: in a very dry turnip season like the last, the early development of the plant would be more encouraged and better sustained by permitting the ground to lie undisturbed a short time, say ten days or a fortnight after dressing it, but previous to finally turning it over for the sowing, it would then be found to be in a fresher and moister state to receive the seed than if stirred about to a later period. But after the plant has got fairly a-head, should the weather continue parching hot, frequent hoeing and stirring of the ground are of service, by admitting air, and exposing a larger surface to the night dews. The error of putting quick-lime and ammoniacal tillages in the ground together is now, I hope, so generally known to be such, as to leave no occasion for me to say more than that it is an error. The next enquiry I shall make of you, and at this season it may be an important one, is, when is it the best time to apply farm-yard manure to grass land? It is a question that I have met with a great variety of opinions upon. The argument generally brought forward in favour of the plan of laying it on now, or before

winter sets in, is, that it protects and shelters the roots of the plants during the winter months. The opponents argue that, by putting it on now, the rains and wet weather of winter wash all its virtues away, and no good is done. In favour of the first, there can be no question but that shelter is afforded; and where a winter follows similar to the last, where there is a long continuance of dry frosty weather, such a shelter would, without doubt, be of great service, and might afford some compensation for the loss of tillage occasioned by exposing it on the surface of the ground—if it be admitted that loss would thereby ensue. But if a deep snow follow, and lie long on the ground, the plants would be sufficiently protected by that, without the manure. Then, taking the opposite question, if much wet follows, does the wet carry away all the virtues of the tillage? Now, as far as the question is concerned, I am disposed to think that, beyond the circumstance of shelter being afforded to the plants, no immediate benefit is afforded by applying it at this season, because I conceive that the plant is in a partially dormant state, and is not actually seeking out for food, and that, if the tillage be applied in February, it would, on the whole, be more beneficially bestowed than now, because it would be then that a renewed vegetation would commence, and then would there be the greatest occasion to supply the demands of the plant. Perhaps to some the effects seen in a grass field, produced by the drainings of fold-yard manure directly into it, might seem to refute the notion that the plant is in too dormant a state to require much food; but then I would remind those that such an instance is not a fair one to cite. There is in that case a continuous supply of extraordinary and very stimulating manure; and then, again, in a very severe frost, the liquid itself becomes frozen, and by thus spreading a thin sheet of glass, as it were, over the plant, affords a very sensible protection to it. Irrigation has similar effects to this case. As to what the extent of the loss of tillage from rains may be, I apprehend that in well-drained lands it would not be so great as generally imagined on lands requiring draining; and on a close retentive soil such loss would inevitably be greater. The effects of draining are not simply confined to the taking water away; it has the effect of rendering the soil more permeable to the atmosphere; it consequently becomes more expanded and porous, and more absorbent; and hence my reason for supposing that the loss of tillage from heavy rains would not be so great on well-drained lands as on land that required draining. In the one case, the rain has a chance of immediately getting into the land, carrying with it the soluble parts of the tillage, which, from the different condition the soil is in, from draining, to the undrained, gets thoroughly diffused through the pores of the soil. On the other hand, particularly in the case of very heavy rains, the tillage is completely washed off the surface, and does not enter into the soil at all. From several experiments I have made with a variety of soils, by placing them in deep pots with a hole at the bottom, to permit water to drain through them, I have found, after pouring solutions of different kinds of salts on them, that they have retained a much larger proportion of the salt than might have been supposed. The proportions varied very considerably, it is true, with different soils; but those that had the greater power of absorbing moisture from the atmosphere retained the most. Again, I have found that an undrained land, where I had applied soluble salts, that but a very small proportion indeed remained in the soil after very heavy rains; on a very close retentive soil, none at all. This, therefore, inclines me to suppose that on well-drained lands, the plants might have the shelter of farm-yard manure afforded them without so great a loss of tillage, but that on undrained lands and cold wet soils a loss might ensue too great to admit of the practice—however, the experience of the practical farmer will best determine which plan is the best. The various circumstances of soil, drainage, and the climate of the season when his experience applies, ought to be fairly stated; and then something like correct data would be furnished, to decide upon the true theory of the success or failure of each system; and a correct decision might then be obtained of the merits of each, amidst such a variety of conflicting opinions as exists at the present.

I have now concluded my remarks on farm-yard manure; but, before I put to the chair the questions which the subject has elicited, for your discussion, I will trespass on your indulgence a short time longer, by making a few observations which I consider, though they do not exclusively belong to the subject of our discussion, still affect your interests very closely, and, in a secondary way, are appendant to our present subject. I will endeavour to be brief. 1st, It is granted that the harvests of 1846 were much below par, both at home and abroad. 2nd, That both at home and abroad the demand for bread stuffs was, from that and the failure of the potato crop, greatly increased. 3rd, A great distribution of demand therefore took place for corn, by countries under scarcity, which became active customers to full markets. 4th, That, in consequence, the English market maintained higher prices previous to the past harvest than could ever have been expected at the time of the alteration of the Corn Laws. 5th, That since the commencement of the last harvest, which has

been good both at home and abroad, prices have vacillated to a great extent, but with a downward tendency rather than otherwise. These are facts admitting of no dispute. What the British farmer has, therefore, felt of Free Trade policy, arises from the condition of things above-mentioned. That this country has exported much of what it purchased abroad, as well as some of its own produce, is no more than what it would have done at a 1s. duty under the sliding scale. I put this hypothetical question: Suppose generally countries are blessed with a full harvest, how will that work upon the English farmer? I apprehend thus, that his customers will leave him unless his markets are as cheap as the markets of other countries. If this be a self-evident proposition, how is he to meet the foreign grower, but by reducing his prices somewhat near the foreign standard? And in reducing his prices, looking at the charges on English capital, how is he to make up his payments? Obviously by increasing his produce. This must be one branch of his policy in competing with the foreign grower, and the conviction of it must come home to the tenant of the smallest holdings. The English farmer must produce a surplus where he has been led to rely on importation to supply the difference; and how is he to increase his produce? Our friend, Mr. Hodgson, told you at our last meeting that this picture is a gloomy one. But I hope it may not be so much so as dreaded, if we only fairly meet our difficulties in the face. The means by which we must compete with rival growers abroad will be, by obtaining the largest quantity of produce from the smallest space of ground, at the least possible expense. Every event in this world, however trifling, is guided by an all-seeing, ever-directing hand. Providence has sent to our aid the discovery of guano. This led to an essential change in the agriculture of this country. We know that this supply must be exhausted in time. Englishmen, however, prove themselves prepared to meet this difficulty; and if the mechanic can, by the manufacture of implements, make your labours easier, the agrarian chemist can find a substitute for the loss of foreign guano; nay, more, he can provide tillages that not only equal it, but he ascertains what is adapted for your own individual and particular use, so as to suit your particular crops, and the peculiarities of the composition of your respective soils. To such a pursuit has the attention of others been turned for your benefit; and it is a laudable pursuit. He who can make two blades of grass grow where only one grew before, or who can increase the weight of a grain of corn even one-hundreth part, by his endeavours, deserves not only your thanks, but that of his country. You have with you now those whose exertions tend to this object. You have in the club Mr. Hodgson, who may be said to have been the first so engaged in this neighbourhood, and I am glad to be able to say that I can testify to the merit of his compost. You have also the humble endeavours of myself. You may now, perhaps, say that I have an interested motive in the matter; but I should feel exceedingly hurt if these circumstances should cause you to suspect my intentions of benefiting you. I candidly confess I have an interest, and I am proud to feel it. Always during my life have I been fond of agricultural chemistry, and pursued the study of it as an amusement long before it was thought of so generally as it has been of late; and now that I have turned my whole attention to the subject, and if the labourer be worthy of his hire, I hope to claim the reward of your encouragement in my pursuit. I therefore have an interest, but I hope and trust that it will always be a mutual interest; and whatever benefit I may be permitted, by your patronage, to enjoy, that you may always find a corresponding benefit yourselves, on the other hand. I will not detain you by saying more on this subject, further than that I prepare my tillages not only to suit them to your particular crops, but to the different kinds of soils. But one word more and I have done. I cannot conclude without again most seriously urging upon you the fact that, if the British farmer is to succeed against the competition of the foreign grower, he must not remain idle. Nothing but extra skill, extra management, will or can succeed. Low farming will be ruin. The landlords must assists their tenants, too, by liberality on their part towards their enterprising tenants, or their rents must suffer by their tenants' ruin. I do not confine myself to the remark, thrown out by some one in the room at our last meeting, about "lowering rents a bit," though, as regards that, I would say, "Live and let live;" but I mean liberality in its more extended sense. Let the example of our worthy President be one. Let our landlords remove all useless covenants. Let them, where they have an enterprising and industrious tenant, meet him and assist him in his endeavours, by giving him all scope and latitude in the way of managing his land, and let him have full and ample security for a return of the capital he invests on his landlord's property.

The evening being now far advanced, it was suggested that discussion on the paper should take place at the following meeting. A long conversation, however, followed on the best method of preserving manures, and the time of applying them on land, and also on the system of deep draining, &c., in which the President, Mr. Bingley, Mr. Green, Mr. Booker, jun., Mr. John Hewitt, Mr. Nelson, and others took part. Among other matters, it was

stated by Mr. Booker, that he was credibly informed that scores of tons of warp or surge from the sea was annually mixed up with linseed cake. At the close of the business, the President, after briefly remarking on the evening's proceedings, concluded by proposing a vote of thanks to Mr. Bingley for his very able and interesting paper, which was unanimously agreed to, and the members separated.

THE PHILOSOPHY OF AGRICULTURE.

It has been remarked (we think rather unjustly), that the agricultural are inferior in intellectual acquirements to the manufacturing classes; and Lord John Russell was evidently of this opinion when he denounced the whole mass of tenant farmers, whose rental amounts to fifty pounds per annum, as stupid and ignorant, and compared their mental faculties to the clods they turned. Notwithstanding his lordship's assertion, we shall be happy to back them against the ten-pound householders of Stroud, for whom he quitted (against his consent, by the bye) the *once dear* electors of Devonshire. We shall not, however, enter into any discussion respecting our premier's opinion on this subject; the object of our present paper is to shew what an enlightened farmer *may* be, and what, we verily believe, many even now *are*. How many branches of natural philosophy are brought into play by the really skilful and scientific agriculturist! Well may it be said with Cicero, that "nihil agriculturâ melius, nihil dulcius, nihil libero homine dignius!" The two sciences, chemistry and geology, are essentially necessary to be understood; the first to determine the nature of the soil; the second to account for its production, when the chemical analysis has been completed. We hear now tenant farmers, before a committee of the House of Lords, talking of soils formed from the "detrita" of the old red sandstone, and explaining very scientifically how manures applied to certain qualities of land are injurious, whilst to others they are beneficial. Farmers knew perhaps practically, long ago, that lime was very efficacious in most parts of Devonshire, Cornwall, Hereford, Wales, &c., and of little comparative service in the eastern and south eastern counties; they knew the fact was so: but now the science of geology has made manifest why such is the case; for, in general terms, it may be laid down, that on all formations, from the primary strata up to the coal (there being a small admixture of limestone), the deficiency of calcareous matter must be made up by applying it as a manure; whilst on the new red sandstone, oolite group, chalk, and tertiary system (there being sufficient already in the soil), no more lime is required to increase the fertility of the ground. In what are these latter formations deficient?—In vegetable matter. Dung and such like manure must, therefore, be used in these soils; which are facts which chemistry teaches us, and geology explains most satisfactorily. Let any one read the evidence adduced before the Lords' Committee on the Entailed Estates' Drainage Bill—let Lord John Russell himself, and, I think, even he would be obliged to admit, as well as every one else, that a great fund of scientific knowledge was displayed by several Scotch and English tenant farmers, not to speak of the acquirements of land-agents and engineers. We cannot help quoting from Mr. Josiah Parkes' evidence before the above committee, to shew what materials for thought and consideration agriculture supplies, and also how worthy the pursuit is, and how enlightened, affording, I may say, opportunities for studying almost every branch of natural philosophy. The chairman asks the witness, "Will you explain what you mean by saying that the Kentish clay land is kept moist by draining it?" Mr. Parkes answers—"The manner in which I believe that process to be effected is, through the free admission of the atmosphere into the soil. We know very well that the atmosphere is composed not only of fixed gases, but also of aqueous vapour; and there is a much larger quantity of aqueous vapour suspended in it during the summer season than in the winter season; that was one of the discoveries of Sir Isaac Newton. Now there is at all times a temperature, with respect to that of aqueous vapour, at which water will begin to precipitate on any body possessing that temperature, and with which the vapour is in contact: this degree of temperature is called the *dew point*. The action of drainage is to cause air to occupy the place previously occupied by water, and to which air could not obtain access; and the lower portions of the soil, being considerably cooler than the air, causes a precipitation of dew or moisture throughout every part of them, when the atmosphere is highly heated. The surface of the soil only is moistened by dew during the night, but the interior parts of the soil are abstracting it from the atmosphere during the day. This beautiful operation was first explained by Sir Humphrey Davy, and in the following words:—'The power of soils to absorb water from air is much connected with fertility. When this power is great, the plant is supplied with moisture in dry seasons; and the effect of evaporation in the day is counteracted by the absorption of aqueous vapour from the atmosphere by the interior parts of the soil during the day, and by both the exterior and interior during the night.' We know that the atmosphere gains access to the subsoil of a clay field, if undrained, through the wide cracks opened by a hot summer; but the very shrinkage which has occasioned these cracks has so closed and hardened the separated masses that the air has no free entrance and exit into what Davy meant by the 'interior parts.' The air, under such circumstances, rather assists in drying than in moistening the mass. A well-drained clay-field never exhibits the wide and numerous fissures common to a wet undrained clay; its condition is rapidly and entirely changed; it becomes filled with air instead of water; and, though what I have

previously termed cracks, in accounting for the manner in which water finds its way into drains, exist, yet these are numerous and minute, almost indeed undiscoverable, after clay land has been drained for a twelvemonth. The laws of the precipitation of superficial dew were explained solely by Dr. Wells, and they came from his pen a perfect theory. I trust that this simple explanation of the causes which maintain drained land in a moist state, though it prevents them from being wet, will serve to illustrate the superiority of deep drainage. It will be seen that one great source of fertility and humidity—the atmosphere—has access to a greater mass of soil; and that, in consequence of the depth drained, the lower soil is placed in a condition continually to absorb moisture, and transmit it upwards, whilst a rapid evaporation may be taking place at the surface during a parching summer." It may be also remarked, that draining would never have arrived at such perfection as it has, were not the geological laws of a succession of strata, in a certain determinate order, well investigated and made out. Geology tells us how springs originate, viz., from the surface water, percolating gravel and other permeable strata, until it arrives at beds of clay which are impervious to it; the fluid then accumulates on this tenacious soil, until it discharges itself, or crops out, as it is technically called, at some point in the valley of denudation, running over the surface, and making very often the side of a hill about two-thirds down wet and swampy. To rectify the evil is simple, when we know how it originates. The organization of animals and plants is a subject which the agriculturist has ample opportunity to investigate. Organic chemistry, which explains to us of what elementary substances animals and plants are composed, thereby informs us what they each require for their sustenance. Vegetable substances, which are composed principally of carbon, oxygen, and hydrogen, with a little potash, lime, and iron, require these elements for food; whereas animals, in whom nitrogen abounds, in addition to other above-named elements, require nitrogen for their support as well as the other articles which nature supplies to plants. The inspiration of oxygen by animals, and the expiration of carbonic acid, and on the other hand the inspiration (if I may use the term) of carbonic acid by plants, and the expiration of oxygen, by means of which what is useless to one is taken by another, and the two great systems of animated nature maintain the air in that state which is necessary to the existence of both—these are subjects which, when studied (and studied they must be by the scientific agriculturist), not only tend to improve his mind, but, what is far more important still, to draw his thoughts to God, as the author of every thing which is wise and good. The winds and rain, the laws which regulate the currents of electricity in the atmosphere, and their influence on vegetation, also afford food for meditation to the contemplative farmer—and who can have a better opportunity? The study of botany, mineralogy, and natural history, may be also called to the aid of the agriculturist; but where is the man to be found who can extend his researches to every branch of science? We think, however, we have said enough to show that agriculture is well worthy the attention of any man, however bright his intellect, and that a philosopher will find better opportunities of prosecuting his studies in the culture of the ground and improvement of the soil, that he can in any *one* OCCUPATION OR PROFESSION whatsoever.

G. W. TUCKER.

Knowle Cottage, Dawlish, Devonshire.

EFFECT PRODUCED BY SALT IN FEEDING SHEEP.

"GENTLEMEN,—Having in a previous paper laid before you the result of the addition of salt to the food of horned cattle, we have great pleasure in giving you the following account of a careful experiment, which was undertaken for the purpose of ascertaining the effect which its addition would produce on the fattening of sheep. For this purpose twenty sheep were set aside, and one-half of them received a proportion of salt, in addition to some food that the other received; and in other respects both lots were treated alike. They had as much as they could eat of aftermath hay,* the refuse of the potato starch manufactory, together with some other inferior hay, bran, oat chaff, and linseed cake.

The lot which received salt consumed rather more food than the others, but the difference is so slight that for eighty-seven days, with ten sheep, the extra food only cost 1s. 3d. These animals received, during the time of the experiment, 43 lbs. of salt, which cost 8s., and for the purpose of accuracy each animal was carefully weighed at the commencement and again at the close of the trial.

The following shows the progress in improvement in weight of each lot:—

With salt.		Without salt.	
1st month	70 lbs.	1st month	20 lbs.
2nd „	58 „	2nd „	62 „
3rd „	40 „	3rd „	68 „
	168		150

Showing an increase of 18 lbs., which at 6d. gives a profit of 9s. by the addition of salt, which cost 8s. It was remarked that during the time the experiment lasted the sheep which received salt drank 106 gallons of water, and the others only 51 gallons.† Whilst the first gave for 100 lbs. of live weight 48.13 lbs. of mutton and 5.10 lbs. of suet, the second gave in the same proportion 47.54 lbs. of mutton and 4.86 of suet.

Though we are perfectly satisfied in our own situation, on the question of the entire uselessness of salt as an addition to the food of sheep, we should like to see experiments tried in other places, before the subject is fairly set at rest."—*Communication to the Royal Agricultural Society of France.*

We may remark, as in the case of Boussingault's ex-

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* It may be necessary to add that in France, as in the south of England, the meadow fields frequently yield two crops of hay in one season.—*Trans.*

† Precisely similar results happened with the cattle in Boussingault's experiments.—*Trans.*

periments, such an account as the above is exceedingly valuable to practical agriculture, as there is no contradicting the assertions which are backed by figures. It seems very evident, from these two series of experiments, that salt is of no benefit to fattening cattle, and we very strongly suspect that the only argument which at all weighs against the conclusions arrived at is founded on the eagerness with which the wild animals seek after the salt licks, many of them it is said travelling hundreds of miles to obtain what seems to be necessary or at least pleasant to them. We confess ourselves at a loss to explain this circumstance; but as in the above experiment salt has been found of no benefit in feeding sheep, and in Boussingault's experiments it has been found of no benefit in feeding cattle, until equally careful experiments show a contrary result, we would certainly say that a very strong case is made out against the further use of salt in the farm yard, for the purpose of feeding cattle.

HADLEIGH FARMERS' CLUB AND AGRICULTURAL ASSOCIATION.

CULTIVATION OF ROOTS.

The annual root exhibition of this club took place on Friday the 19th November, at the Corn Exchange. The show was very large and excellent: the merits of the various sorts shewn will be found fully discussed in the evening's proceedings reported below. The prizes offered by the club for the best crops of root, and for the best roots exhibited, were awarded as under:—

Two acres of mangel wurzel, Mr. J. G. Stow, Boxford, £1; ditto Swede turnips, Mr. Benjamin Mason Kersey, £1: ditto other kind of turnips, Messrs. R. and J. Rand, Hadleigh, £1; one acre of carrots, Mr. Jas. Berry, Langham, £1; six globe mangel wurzel, Messrs. R. and J. Rand, 5s.; six long mangel wurzel, ditto 5s.; six Swede turnips, ditto 5s.; six white turnips, Mr. Thos. Partridge, Aldham Hall, 5s.; six Scotch turnips, Mr. Jas. Berry, 5s.; six white carrots, Mr. Joseph Clarke, Hadleigh, or if he be ineligible to show, to Mr. F. B. Philbrick, Colchester, 5s.; extra prize Swede turnips (of extraordinary size), Mr. H. Sallows, Semer Dairy, 5s.; peck of cattle potatoes, Mr. Isaac Strutt, Hadleigh, 5s.

A portable fold hurdle, or sheep shed, more particularly adapted for use in the lambing season, was also exhibited, which attracted much attention. It is the invention of Mr. Henry Partridge, of Shelly Dairy, and had a galvanized iron covering and back, being so constructed that the covering can flap down, and by means of a wheel at the further end the shed may with the greatest facility be removed from place to place.

In the evening the Members of the Club, to the number of about forty, transacted the annual business of the Club, and discussed the merits of the various sorts of roots which had been exhibited. Robert Kersey, Esq., the President of the Club, took the chair, and in the absence of the Vice-President, Mr. Joseph Rand, his brother, Mr. R. Rand, was called to fill that position.

The President, Vice-President, Treasurer, and Secretary having been re-elected for the ensuing year, after flattering acknowledgments of the services they had rendered to the Club, and the Committee having been chosen,

The CHAIRMAN said that as they had now disposed of the formal business of the meeting, he would beg to offer his sincere congratulations to the Members of the Club upon the very interesting show of roots that day. He had taken the opinion of several gentlemen around him, and it was their feeling that it was the best ever witnessed at the Hadleigh Club. He thought the improvement in the growth of roots in that district afforded a proof of the utility of a Farmers' Club. If they looked back a few years previous to the establishment of that club, and took the weight per acre of roots then grown, they would find it far surpassed by the weight now grown. He congratulated Mr. Rand on having this day gained three prizes for roots exhibited, and also a prize for the best two acres of white turnips; and he thought he could not do better than call on that gentleman to state his views upon the best mode of cultivating the root crop.

Mr. RAND should be happy to obey the call so far as lay in his power. His mangel wurzel was grown this year on a piece of newly-broken land, having had only one crop of oats on it. It was tolerably rich land, and he did not know, therefore, that there was any particular merit in his growing the best roots shewn that day. Both his long and globe mangel were grown on the same piece of land, the seeds having been mixed. He cultivated the land in the usual way; he planted on the ridge, 30 inches apart, and manured, as usual, with 16 loads of farm-yard manure, and nothing further was done; the land had been previously land-drained and chalked. One lot of his swedes was grown on a piece of land which had been subsoiled; the two other lots were taken out of another field. They were what he considered to be the Skirving turnips, and he was inclined to

think that was the best sort of swede that could be grown; it appeared to him to be of the best quality and to produce the greatest weight. It was curious to see turnips differ so much in appearance as some of the specimens shewn. For instance, those which Mr. Sallows had shewn were very good roots, and heavier than his own; but they did not appear the same species as his, which was a long root, producing nearly as much underground as above, while Mr. Sallows's was a round sort, and appeared most grown on the top of the soil. Perhaps the mode of cultivation had caused the difference. Mr. Sallows's was planted in the latter part of April, and his own in the latter part of June. Mr. Sallows's were planted on the ridge, and hoed like mangel wurzel; and that might be the reason why they were more out of the ground, and appeared of a different character to his own. Both were grown from the same stock originally, both having had their seed from Mr. Mason, but all originally came from Mr. Everett's. He thought it an exceedingly good stock, and so long as Mr. Everett had such stock, he thought it would be advantageous for the farmers to go to him.

The CHAIRMAN gave the healths of the Judges of the Acres—Messrs. Matthews, Partridge, and Everett, to whom the club were under great obligation for visiting the different pieces and giving their opinions upon them.

Mr. MATTHEWS returned thanks, and after acknowledging the kind treatment the Judges had experienced from those whose farms they looked over, said it might be proper to make some observations on what they saw. The Swede turnips which they had looked at were not of first-rate order; they had generally received so much injury from the drought that they were not so good as in some years. The gentleman to whom they had awarded the prize had some very good ones, of good quality; but they were not so heavy as they had sometimes been. The mode of planting adopted by Mr. Mason he should have been inclined to find fault with; but he supposed it would be of no use, as Mr. Mason had managed to get the prize several years. He himself was inclined to support the system of drilling. Mr. Hawkins generally got a regular plant on the drill system; indeed, he seldom saw so general a plant as on his land, but this year the dryness of the season had affected the land, so that he had not been able to get a prize. But their friend Rand happened to take off the prize, though he only threw the seeds about promiscuously. As to the mangel wurzel, the Judges had awarded the prize to a very superior piece, cultivated on a system which they always found got a prize—that was, being thickly planted. Mr. Mechi and other gentlemen said that the plants could not be too wide apart; that four feet would be too narrow, for the roots would reach one another; and that, when they came to weigh the roots, the thickly planted would lose in the weight. But there were some mangels, and other roots, let them have ever so much room, would never get to a large size; whereas if they were planted thick they would still be of the same size—the deficiency in numbers, they would find, was never made up by extra size. That club had always given a prize to those which were thickly planted. Mr. Everett had generally carried off the prizes, and he planted from 20 to 27 inches. This year the prize roots were 27 inches, and a very beautiful plant, not so large as the turnips on the table, but still very large. He should be happy to hear in what way the land was farmed. As the club gave £1 for a prize, the members wanted to profit by it, and indeed the gentlemen who carried off prizes should give this information, which would be for the advantage of the club. The white turnips were not of a very superior order: they were the best the judges saw, but nothing very extra. He should be very happy to see a couple of acres like those on the table (white globes, grown by Mr. Edward Matthews, of Wickhamskeith, and weighing about 18lbs. each), but such turnips were not grown in every parish. He believed they were grown on the drill system, rather thinly planted. With respect to carrots, he might have a prejudice a little in their favour: he thought them a very profitable and useful crop. This year they came on very good; those which the judges looked over (and perhaps they saw as many of them as of all others put together) were a very heavy crop, but they did not find the thinnest plant produce the most weight, though certainly they were the largest ones. Those to which the prize was awarded were of very superior quality as well as of considerable weight; they were of the yellow kind, and were very neat and well-formed carrots.

The CHAIRMAN called upon Mr. Everett, who had introduced so valuable a stock of Swede turnips into the neighbourhood.

Mr. EVERETT was glad to have introduced such a stock as they approved of, and should be happy to supply what was wanted of the same stock; to say this was not, however, his object in rising. He quite agreed with Mr. Matthews, that it was with much pleasure the judges had performed their task of looking over the roots. They took an account of the weights per rod, which perhaps it would be as interesting for them to know as anything he could say by way of comment. Mr. Matthews had stated to them the distance from row to row, and from root to root, which he considered to be the best, more especially for mangel, for which

he (Mr. Everett) had gained several prizes. Mr. Matthews was correct in the width he gave, with one exception; one prize he gained was for mangel at the width of 30 inches. That was the first year of prizes being given, and before mangel was much grown. Since then he had planted at 20 to 24 inches; 22 inches square from root to root he considered the best distance, if the land was strong and likely to grow the mangels good. As to varieties, from what experience he had had, the red globe mangel in all respects had the preference—he considered it had a trifling value above the yellow, and also above the long red. He believed that the quality was equally good in general, and the weights heavy. He agreed with Mr. Rand as to the value of Mr. Skirving's swede above all others. He had seen the comparison tried many times between the Matsons and the Skirvings. The Matson's he thought stood prominent amongst the fine tops, and the Skirvings amongst the coarse tops. In the first place they were more likely to get a plant from the Skirvings—the fly was able to master the one, and not the other. In addition to this, the weight was far beyond that of the other sort. The little difference in the quality of the Matsons did not make up for the difference in the weight. As regarded the colour of the skin, they had the authority of Mr. Lawson (the first authority in Scotland) that there was no preference to be given to the one above the other on that account. He might here mention that on looking over Mr. Lawson's book that evening, it seemed to be 299 years since the mangel was first introduced into this country. With regard to the white turnips, perhaps the most valuable sort amongst them was that which had that day gained the prize. They were very good specimens. He believed Mr. Partridge considered them a very valuable kind; except for very early food they were preferable; they were more hardy, and resisted the frost longer. That particular shape generally weighed more than the flat-headed, and was more likely to keep. There ought to be sufficient roundness at the top to carry off the water. The sooner the flat turnips could be turned out of the country, the better; they ought not to be grown at the present day, and he thought these societies were calculated to hunt them out of the country. They had nothing in their favour, they had no quality beyond others, in fact they were generally inferior. The only other roots worthy of mention were the carrots. They had no red carrots there that day, though there was some land in the district well calculated to grow them. They were a very valuable root, and on some lands could be grown to nearly, if not quite, as great a weight as the other roots—whether the quality would make up for weight he could not say, but he did not think it so good as that of the others. He would now state the number of roots per rod, and the weight, on the farms the judges went over.

White Carrots.

	lbs. per rod.	*No. of roots.*
Mr. James Berry ..	263	313
Mr. Joseph Clarke..	300	182
Mr. Isaac Strutt ..	340	330
Mr. James Berry..	331	296
Mr. Henry Partridge	320	244

Swede Turnips.

	lbs. per rod.
Mr. Thomas Hawkins....	297½
Mr. B. Mason	307
Mr. Isaac Strutt	223

Mangel Wurzel.

Mr. Joseph Stow.	683
Messrs. R. and J. Rand ..	540

(All with tops and roots on, and clear from dirt.)

Mr. Isaac Strutt had the greatest weight; he had 340 roots, which was much the largest number, but he had a great many small ones which never ought to have been there, through the neglect of the hoers. There were only three quarters of a ton weight difference between Mr. James Berry's and Mr. Strutt's, and the judges thought Mr. Berry's (which were of the yellow kind) of the better quality, and more uniform, and they therefore gave him the prize. In his piece there were very few small ones—they were all of useful size, and had had more care about the hoeing. The proper distances to plant had been alluded to. Now he had observed in Mr. Hawkins's field one row entirely missed, and his friend Mr. Matthews and himself had a little argument there on the comparative value of thick and thin planting of carrots. He had not time to stop to weigh the two rows as compared with the three together, but he thought Mr. Hawkins would be able to give the result. Mr. Mason's Swede turnips gave 307lbs. per rod, but the judges did not count the roots. (Mr. Mason said there were 71 on the half rod.) As to the mangel wurzel, it was worth remarking the difference in the weight between that and other roots; Mr. Stow's gave 683lbs. to the rod, and Mr. Rand's 540; the weight therefore of Mr. Stow's mangel was more than double the weight of the carrots, and the carrots were heavier than the swedes. It would appear from this decidedly that they could grow, and did grow, a much greater weight in mangel than they did in any other root, especially on the description of soil which was calculated to grow mangel. He would now explain his reason for not having competed this year for a

prize. He must say that he was satisfied with those he had already gained; but he would mention that he had weighed a rod of his mangel, and he found it come to 743lbs. a rod, that would be over 53 tons per acre. This included the tops.

The CHAIRMAN said their worthy friend Mr. Everett had implied that he could not condescend to shew; be would not honour them by carrying off the prizes of the club. If they were to put a fair interpretation on this, it was something like a challenge to the club for next year. If this was what Mr. Everett meant, he himself should be happy to enter as one of the competitors with that gentleman. (Applause.)

Mr. Everett said it was a fair interpretation. He had said he never would refuse a challenge with any one for mangel, and should be happy to join Mr. Kersey in his sweepstakes. (Applause.)

Mr. GRIMWADE proposed the healths of Mr. Makin and the Messrs. White, who had officiated as judges of the roots exhibited at the Exchange.

Mr. MAKIN returned thanks, and expressed his gratification at the excellent exhibition—the finest, he thought, he had ever seen at Hadleigh. The show of globes he thought most magnificent, and had never seen any thing equal to it. He was rather surprised to see so small a show of long beet, there being only three competitors, but the quality was very good. The swedes were uncommonly good; but of Scotch turnips there was only one lot, which he was sorry to find, as it was an excellent root, and he thought nearly, if not quite, equal to the swede. He hoped another year there would be more competitors for that description. The carrots were exceedingly fine. He should have been glad to see some of the red Belgians, which he had seen particularly fine. The potatoes were very good, but there were not many competitors—he should like to have seen more.

Mr. WHITE also returned thanks.

The CHAIRMAN said that Mr. Stow's name having been mentioned, and that gentleman having taken a prize, he would beg to introduce him to the meeting.

Mr. STOW said he would just state how he cultivated for mangel wurzel, it being the only thing he exhibited. His land, like Mr. Rand's, was old pasture, but he had had two crops off it before the mangel wurzel, namely, beans and wheat, and he got his land in a tolerably good state in the autumn for mangel. He did not put on more than about ten chaldrons per acre of farm-yard manure. There were about 3½ acres in the field, and about two acres of it he "flayed" and carried the flax upon some poor land. That was where he got his plant: on the other part the plant failed, and he drilled it with turnips to fill up, but they did not come up well. The mangel which did grow on that part was very large, but the quality was not equal to the thick plant, which obtained the prize. He thought thick planting the proper way of cultivating mangel. He had not heard what distance Mr. Rand planted at (Mr. Rand said the rows were 30 inches apart, and from plant to plant about 18 inches.) In his two acres which got the prize there were very few transplanted ones; on about half an acre of the other land he got some very good roots, but not equal to those on the two acres. The time he planted was neither early nor late, but not till many people had theirs up. He did not plough till the spring, except to put the muck in the ridges, and split them in two. He had his seed from his brother, and it came originally from Mr. Everett's, and he thought it rather a superior sort. He thanked Mr. Everett for suffering him to go off with a prize this year, but should be happy to contest with him next year as a third competitor for mangel.

The CHAIRMAN called on Mr. Mason to explain his "promiscuous" method of cultivation.

Mr. MASON said he should lay himself under the lash of his landlord by making the statement, which he was afraid would be conveyed to him by Mr. Matthews, his brother. His piece of land was a latish crop of barley, and he stetched it across, and carried the stetch across twice. He sowed guano, and harrowed it once, and then sowed turnips, and when the vegetation was going on he harrowed it again. He put on 3 cwt. of guano per acre broadcast, and sowed the seed croadcast. He ploughed the land only three times, but he should have ploughed it five times according to his covenant, but that he hoped Mr. Matthews would overlook. There was no muck beyond the guano. He considered, however, that there was no credit due to him, but the crop had turned out lucky.

Mr. GROWSE proposed the toast of their Vice-President, Mr. Joseph Rand, whose illness they all regretted, and hoped he might speedily be restored to health.

Mr. R. RAND acknowledged the compliment.

Mr. EVERETT would now challenge the Chairman to shew against him next year for all descriptions of roots. He had only one description that he could have shown this year, and thought it not worth while for the judges to come round so far for that little lot.

The CHAIRMAN explained his reasons for challenging Mr. Everett as to mangel wurzel, and then called on Mr. Hawkins to state the result of his thick and thin planting of carrots.

Mr. HAWKINS said that with regard to the little affair of a row being missed in his carrots, it happened that his man let the drill drop, and so missed

a row. Mr. Everett thought the two next rows equal to the other three where there was not one missed. He could not give the result as he wished, for just as he was about to weigh them some friends came in, and he was obliged to leave off. As to growing roots, he had on two or three occasions brought the subject before the club, and in some degree his experience bore out Mr. Matthews's observations. But when they talked of thick and thin sowing, they ought to define what was thick and what was thin sowing; otherwise they would fall under the lash of some zealous friends who taught them how to sow corn and roots in the present day. With respect to mangel wurzel, he thought it established by the best growers that 27 inches baulk, and about 15 inches from root to root, on an average of seasons, would produce the heaviest crop on the generality of lands in this country. The Norfolk farmers adopted this distance, and he thought if at that distance they could grow roots weighing six or seven pounds, they would produce a heavier crop than at a greater distance. Swede turnips depended much on the land. On the light land in his neighbourhood they found it inconvenient to get them close. Perhaps the most convenient distance to him was about 20 inches, which allowed him to drill the turnips, and set them out about 10 inches from plant to plant; when thicker sown there was no room for the horse to tread in hoeing, and much injury was done. His crop of turnips this year was the worst he had known for several years; they promised as well at the time of hoeing as most crops, but no one could farm against seasons; however they might cultivate, they must leave it to Providence to give them the increase of the soil. He thought the sort of turnips to be grown should depend on what they were wanted for. Those on the table he thought were grown on the ridge, and he thought they might best grow the earlier sorts on the ridge. If gentlemen would try several consecutive years, and grow partly on the stetch and partly on the ridge on heavy lands, he thought they would find that though they might get more on the ridge, the land would not plough so favourably for the barley crop, and that they would grow more barley on the stetch than on the ridge, which was a consideration; but he thought, where the soil was well cultivated, and pretty good, ridge turnips would produce the greatest weight. His own white turnips he did not want till after Christmas; the consequence was, he drilled them about 15 inches generally, and set them out the same distance as the swedes. He found that if he got his turnips too big at this season, if the frosty weather set in, more turnips would be destroyed in the winter, and they would not keep so well for the flocks. When they were to be drawn off the land, he thought they ought to be drilled not less than 18 inches. He had not been many years a cultivator of carrots, but it appeared the opinion of gentlemen he had talked to, successful growers of carrots, that on light lands they would not do so well to sow very thin. He had seen many carrots drilled 18 and 24 inches. He had drilled at 12 inches from row to row. The Essex farmers drilled successfully at 9 inches, but he did not think they ought to be less than 12 inches. For red carrots perhaps 9 inches would do; but white carrots should not be less than a foot between the rows. Five pounds of seed was the quantity he put in. The difference in seeding was very great in some parts. Near Woodbridge they put in hardly more than 4lbs.: near Braintree and in other parts of Essex, 12 to 14 lbs. When the seed was plentiful they hardly ever thought of less than 7 or 8 lbs. On the other hand, he thought there was no necessity for sowing thin; he should not drill less than 5lbs. an acre. The great thing was to ensure a regular plant. The best piece of turnips he had seen this year was ploughed but once, and scarified in the summer; it was grown in his parish (Assington) by Mr. Norden; and he would be bound he would get nearly double the weight per acre that he himself had, and he thought the judges would agree that he was not far behind his competitors. The system Mr. Norden pursued was rather laughed at, and he was represented as not the best of farmers; but he certainly beat every one in the parish. He ploughed part of the field in November, and the other part not till March and that ploughed in March produced the best turnips. He had used night soil for his turnips. His method was to have pits dug about his farm, in which he put the night soil, and he then covered them with straw. He mixed these together, and called them "pies"—(laughter.)—and he put on about seven loads of pie, and he got about 800 bushels per acre this year. He had been pulling them up for wheat, but he (Mr. Hawkins) was convinced that if they had stood till winter they would have been of a much greater weight. He thought, as many of the gentlemen present were living so near towns, and as the sewerage of towns was going on, this fact ought not to be lost sight of. Night soil was certainly one of the most profitable of all manures, and the cheapest of any they could get for the land. That piece of Mr. Norden's land where the field was ploughed up in March was the best side of the field. It did not appear that late or early cultivation made the difference, but that it depended on the tilth of the land, and on the manure put in. He never sowed turnips without artificial manure. He thought, with Mr. Mason,

they were apt to put too much under the root and not at the side. Artificial manures should be distributed as equally as possible, due regard being had to having them as near the plant as they could be, that it might get the advantage of them. He had tried several experiments this year: he used first dissolved bones; and he got from them the best plant, and they came up the quickest to the hoe. He mixed the same amount of guano and bones together; the plants did not grow so quickly, but he thought them ultimately the best. He drilled them, at the same cost. He tried one acre with bones, and two acres with bones and guano mixed. Those manured with the bones grew the fastest, and came up to the hoe best; but after a time, when they came to bulb, those with the mixed manure grew the fastest and did the best. He meant to weigh them, and see what was the difference. He drilled also with guano alone; there was not so good a plant, but at the same time they were as large as the others. He thought that when guano was used, it required great care not to put too much in a place. In his case he was sure that a great many of his plants perished from being too near each other. He knew that many of his friends who were in the habit of drilling turnips and using guano, invariably broadcasted the guano and drilled the turnips, and they found the plan preferable. Still he thought is was of advantage to have a small portion of the manure go in with the seed; it raised the turnip to the hoe quicker, and secured it from the fly.

Mr. Rand asked Mr. Hawkins when Mr. Norden ploughed in his "pie"?

Mr. Hawkins said once in the autumn and once in the spring.

Mr. Postans had been told that he had turnips of 16, 17, and 18lbs. weight.

Mr. Everett said the number of bushels Mr. Hawkins had stated as the produce would give 20 tons to the acre.

The Chairman gave the healths of the professional gentlemen who were members of the club and association, and congratulated one of them on being a successful competitor. He admired the nobleness of mind and the independence he expressed, when, upon its being stated that if Mr. Clark should be deemed ineligible to have exhibited, the prize would be awarded to him, he would scarcely condescended to stand second; and said if he did not stand first he would stand nowhere. He was happy to say that Mr. Philbrick had stood first several times. The other day he (the Chairman) walked over Mr. Philbrick's (for him) rather extensive occupation, consisting of something like 20 to 30 acres of land, and most of it as poor soil as he ever walked over. Knowing the character of the soil, when he saw the roots that day exhibited, he expressed his astonishment, and Mr. Philbrick told him that the great cause of the root being so good was the double-trenching, and it could be seen to a single inch where the land had been double-trenched. Part of it at present was in carrots, and he (the chairman) remarked on looking at it, that there would be double the weight of roots on the land double-trenched, as compared with the other part.

Mr. Philbrick, in returning thands, said the chairman had alluded to the interest he felt in these matters, which certainly was very strong. It was a matter of amusement with him, and he fancied there was really more merit, if a man could produce a good crop from poor land than in producing a good crop from good land, "provided," as they, the lawyers, all said, the expense of producing was not too much; for if they expended fourteenpence to get a shilling, the sooner they left off the better. Their chairman had said that his land was as poor as could be found—it was what he himself should term generally an inveterate gravel. At all events, it was of the poorest possible description, and he found that, as long as he attempted to farm by the plough, in the ordinary way, until the land should be deeply stirred, all his money would be thrown away; whereas, if he could only muster up courage to go to the expense of double-trenching, he would be repaid by the first crop. Mr. Kersey was a witness to that, and the carrots he had brought to Hadleigh that day were not intended for exhibition, but to shew Mr. Kersey, as they came from a field which he intended to trench entirely, but was taken ill, and only part of the field was trenched. Colchester, it was well known, was one of the driest places in the district, and this had been a trying season. During the drought, the plants on this trenched land looked green and stood well; the value of the trenching was more apparent as the crop came to maturity, and it was a matter of speculation what the difference was. He had a rod taken up yesterday; and on the trenched land there were over five and a-half bushels of carrots; on the part not trenched, not two and a-half. Now five and a-half bushels would be considerably over 800 bushels an acre—five bushels would come to that—and of course a crop like that near a large town was of considerable value, so that the expense of trenching would be repaid by the first crop. He had some land, which Mr. Kersey did not see, which was served in the same way six or seven years ago, and that land now grew two sacks of corn per acre more than it did before it was trenched; so that the improvement was permanent. He was rather a fancy man in regard to the stock for his plant, and

he believed that had his seed been good, he should have had a better crop on the piece alluded to last year; for the small piece he bought the seed as long yellow. It was sown on the same day with the seed of the red globe, and the land was of precisely the same description. The red globe was sown more on the hill, on soil rather worse than the other. When the plant came up, he found that what he bought for long yellow was an assemblage of all sorts, and all of them bastards; there was not a good root; it was a positive failure of the crop. There was nothing which could be called a root in point of weight—there were roots that spread, rose-headed roots, and heads that did not come out of the ground two inches. The red globe seed produced some of the roots shewn that day. This induced him to think that gentlemen were not sufficiently careful in the selection of roots for seed, or in the place they got the seed from. When a root was selected for seed, it should have every possible good quality that could be found in a root; and when a good root was found, care should be taken not to mix it with bad ones. When seed was sown by market-gardeners or seed-growers they grew a number of sorts in the same neighbourhood, and as a matter of course they became inoculated with each other, and the sorts were deteriorated; in fact they could never get a true sort.—Mr. P. explained, in answer to a question respecting his turnips, that his land was simply trenched as Mr. Kersey saw, the top-soil being taken off and put to the botton, and no manure was used.

Mr. Growse also returned thanks, and proposed the health of their chairman. (Much applause.)

Mr. Kersey returned thanks, expressing his gratitude for the continued confidence reposed in him as their President, and called on Mr. Sallows, who had had the extra prize for Swedish turnips, to address the meeting.

Mr. Sallows stated that he put in his swedes very early, on the 29th of April—the same day as he drilled his mangel. He had only about three-quarters of an acre, which was the reason he did not compete for the acres, but certainly it was the best piece of turnips he ever grew. They were coarse, as no doubt had been seen; but he never knew swedes that were not a little so. He had noticed some last year at Smithfield; they were the Skirving's kind, and some weighed from 24lbs. to 29lbs. each, but he did not see any with a clean bottom or small top. Those he had shown to-day made quite a handle at the top; but if those tops were cut in pieces, it would be found there was very good fleshy turnip even in the stalk. Some of his last year had as much weight in the stalk as they frequently saw in the whole turnip. Those he had exhibited were manured with burnt clay only, and he ploughed between them just as with a ngel. They were in rows 27 inches apart. He left them thick in the rows, and ploughed between them twice in the summer. They were the same stock as Mr. Rand's, and came originally from Mr. Everett's four years ago, but the seed was obtained from Mr. Mason, and they did not look like the same turnips; but this he believed arose from the different manner of cultivating them, as was evidenced by a similar case which had occurred to himself. He had a piece of turnips, a flat of six acres; he sowed the whole of it, except two stetches, with guano, at an expense of 36s. per acre. The guano stetch he left was rather more than the width of the table, but a very long one, and there was no comparison between that stetch and the two on each side of it. The two were manured with his farm-yard manure at an expense of £4 an acre, and they were certainly the best—as they ought to be, considering the expense. He had heard it said that nothing was so good for turnips as guano. He thought it a very good thing, but farm-yard manure he must say was the best. He intended pulling them up next week, and should make a comparison of a square rod on each stetch.

Mr. Hawkins proposed the healths of the Treasurer and Secretary of the club, who were the most efficient officers. This was now the 8th year of the society; it had grown from a farmers' club to an agricultural society, and the members had discussed agricultural practice over and over again, and compared their systems, and he thought it might be said they had profited thereby. Farmers' clubs, he thought, ought now to take a different turn. Considering that so many scientific gentlemen had come forward to lend aid in applying science to agriculture, he thought a great deal of good might be done, if, instead of discussing the practical, they were to take a scientific subject, such as botany, chemistry, geology, or entomology. If they did this, and tried experiments, they would bring agriculture to a greater perfection than hitherto. While they had the assistance of such gentlemen as Professor Henslow, the Rev. Mr. Sidney, Mr. Curtis, and others—(A voice: "And Mr. Mechi,"—laughter)—and here he was happy to say that at Sudbury they were about to form a farmers' club under Mr. Sidney's auspices, and he anticipated much good therefrom, as that gentleman had been eminently useful in the parish he came from. When they had the aid of these scientific men, he thought they might get up something monthly; and if they corresponded with other clubs, and sent the results of their experiments to the Royal Society, it would benefit agriculture more

than it could be benefited by any other means.

Mr. GRIMWADE and Mr. CLAYDEN respectively returned thanks.

Mr. PHILBRICK proposed the health of Mr. Robert Rand, who acknowledged the compliment; and after some little discussion on the terms of Mr. Everett's challenge, the meeting broke up.

The discussion was carried on throughout the evening with great spirit, and appeared to excite much interest.

SHADWELL AGRICULTURAL IMPROVEMENT SOCIETY.

This useful and improving society celebrated its second anniversary, on Monday the 18th Nov., at the Welington Inn, Shadwell, near Leeds. A sweepstake show was arranged amongst the members, who carried it out in a most spirited manner. The exhibition of stock, though first of the kind in the neighbourhood, was surpassed by none in the district. The show of cattle and pigs was remarkably good. A boar of the small breed, the property of D. Cooper Esq., of Shadwell Grange, was declared by competent judges to be one of the best animals of the kind in the kingdom. There was also a store pig of the same breed, the property of John Cooper Esq., which for symmetry and quality was unrivalled. The labourers' pigs excited the surprise of all who saw them, and reflected the greatest credit on their industrious owners, who are not left behind in the march of improvement by those who employ them, but have means and opportunities afforded of providing something more than a bare subsistence. The show of horses and poultry was small but good. The following is a list of the successful competitors.

HORSES.—The best mare for agricultural purposes—Mr. Thackray, Roundhay. Mr. Bailey, Birkby, Ard Walker, Esq., Seacroft, commended. The best colt or filley, 1 year old, Mr Bailey, Mr. Smith, Gipton, and Mr. Thackray, commended. The best draught horse of any age, Mr. W. Hardcastle, Seacroft; W. Taylor, Esq., ditto.

CATTLE.—The best bull of any age—Mr. Fawcett, Shadwell. Mr. Smith, Mr. Middleham, commended. The best cow of any age, in calf or milk, Mr. Smith, Mr. Middleham, Shadwell, Mr. Kirk, Roundhay, commended. The best two year-old heifer—Mr. Smith, Gipton, do. Mr. James Mawson, Wike, commended. The best yearling heifer—Wm. Taylor, Esq. Mr. Smith, Mr. Whittenbury, Shadwell, commended. The best heifer calf under a year old—Mr. Middleham, Wm. Taylor, Esq.

SHEEP.—The best ram of any age—Mr. Thos. Thackray, D. D. Cooper, Esq. The best pen of five breeding ewes—Mr. Hardcastle, Mr. Thackray.

PIGS.—The best sow, large breed—Mr. Haigh. The best boar, small breed—D. Cooper, Esq., Mr. Thackray. The best sow, small breed—Mr. Smith, Mr. Thackray. The best male pig under 6 months old—Mr. Marshall, Shadwell. The best female pig under 6 months old, large breed—Mr. Whittenbury. Do. Do.—Mr. H. Snowden, commended. Small breed—Mr. W. Snowden. Do. Do.—Mr. D. Hargrave, Shadwell, commended. The best male store pig, large breed—Mr. Thackray, J. H. Horsfall, Esq., Shadwell. The best female store pig—Ard Walker, Esq., Mr. W. Snowden. Small breed—John Cooper, Esq. The best store pig shown by any farmer's labourer resident in the township of Shadwell, Scarcroft, or Roundhay—Geo. Smith, Shadwell, £1; John Daker, Scarcroft, 10s.

POULTRY.—The best 2 ducks and a drake—D. Cooper, Esq., Ard Walker, Esq. The best cock and 2 hen turkeys—Mr. Wm. Kirk. The best golden pheasant cock and 2 hens—George Goodman, Esq., Mr. John Umpleby, Shadwell. The best two chitteprat hens and cock—Mr. Haigh, J. H. Horsfall, Esq.

EXTRA STOCK.—Amongst the extra stock were some very fine specimens of pigs, &c., by the following gentlemen:—David Cooper, Esq., boar pig, 13 weeks old, highly commended; Mr. John Thorp, boar pig, 21 weeks old, highly commended; Mr. Thomas Snowden, of Seacroft, gilt pig, 21 weeks old, highly commended.

PLOUGHING.—The best ploughman, who shall have been in the employment of a member for the last six months—John Bailes, servant to Mr. Coupland, £1; William Vine, servant to Mr. Middleton, 10s. The best ploughman under eighteen yeart of age, on same conditions—Charles Ingham, servant to Mr. Thackray, £1; Henry Tipling, servant to Mr. Kirk, 10s.; John Noble, servant to Mr. Smith, 5s.

The judges of the stock were Mr. Beilby, Wothersome; Mr. Scriven, Aberford; Mr. Ridsdale, Rooley. The judges of the poultry were Mrs. Sparling, Bardsey; Miss M. A. Hardcastle, Scarcropt; and Mrs. William Kirk, Roundhay.

Upwards of forty members and friends sat down to an excellent dinner at the Wellington Inn, provided in Mr. Haigh's usual liberal manner. The room was tastefully decorated with various kinds of turnips of enormous size, evergreens, &c. Also several specimens of yellow globe beet, grown by Mr. W. Snowden, which weighed upwards of nine pounds each. Over the president's chair was a blue banner bearing the motto of "God speed the plough." Over the vice-president's chair was a similar banner, bearing the inscription "We live to improve, or we live in vain." After dinner several loyal and patriotic toasts were given and ably responded to, and the proceedings of the day and evening will be long remembered by those who had the pleasure of being present, amongst whom were—Mr. William Scatchard, of Thorner; Mr. Thackray, Cobble Hall; Mr. J. H. Horsfall, Shadwell; Mr. Taylor, Scarcroft; Mr. Hardcastle, Scarcroft; Mr. M. Hepworth, Leeds; Mr. Wittenbury, Shadwell; Mr. John Smith, Gipton; Mr. Jesse Dobson, Leeds; Dr. Hart, Scarcroft; Mr. J. Thorp, Peckfield. Judges—Mr. William Scriven, Aberford; Mr. Ridsdale, of Rooley; Mr. Beilby, of Wothersome; Mr. Middleham.

THE BEST METHOD OF MANAGING LIQUID MANURE.

Fig. I.

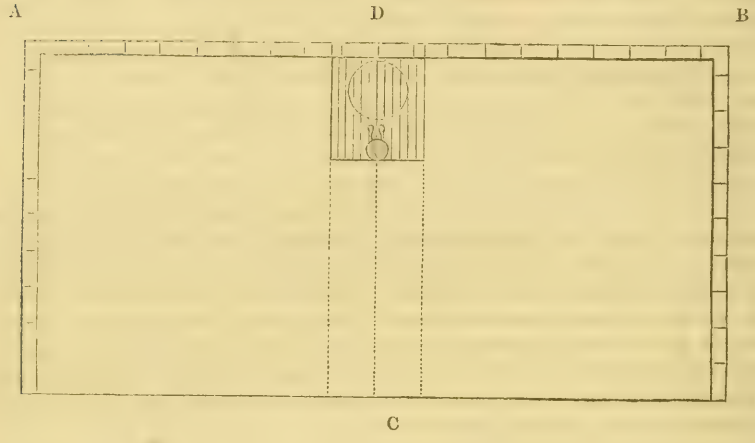


Fig. II.

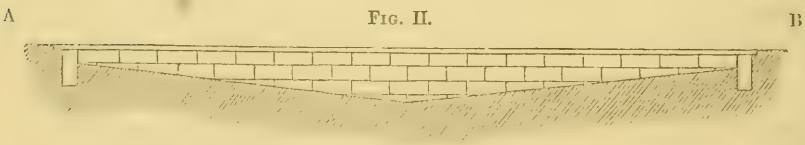
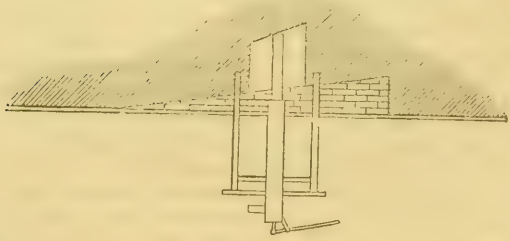


Fig. III.



The French Minister of Agriculture has recently decided that Mr. Schattermann, a German, was the winner of a prize offered for "*the best method of managing liquid manure, and the construction of receptacles for farm-yard manure.*" The following is a brief outline of his plan, as published in the *Moniteur Industriel.*

Fig. 1 is a ground-plan of the receptacle, 22 yards long and 10 yards wide. The bottom is paved, and the yard surrounded by a low brick or stone wall. The whole place is divided into two equal parts, by a conduit two yards wide running down the middle. At the low end of this conduit there is placed the liquid manure tank, with a pump and filtering frame. The conduit has a fall of rather more than one inch to a yard towards the tank; both halves of the yard have also nine inches' fall to a yard from the walls, so that the liquid in all parts is conducted to the sewer and thence to the tank. Fig. 2 is a section in the direction of A B, without showing a vessel 4½ feet wide by 5 feet deep, which is sunk with its edge level with the surface at the end of the water channel. Attached to this vessel is a scaffold 9 feet 2 inches high, 7 feet 8 inches wide, and 6 feet 2 inches long; the top of the vessel is carefully covered up with planks of wood, which are so arranged as to prevent the straw and manure from entering along

with the liquid manure. The top of the scaffold is so built that a man can stand and work the pump, which is recommended not to be less than 17 feet long, so as to reach from the bottom of the well to a sufficient height above the scaffold. Fig. 3 is a section in the direction of C D, showing the pump, well, and scaffold. The top of the liquid manure tank is covered with long straw (in addition to the planks), and with ordinary care or attention there is no difficulty in using a water-cart for the liquid manure, with holes only one-tenth of an inch in diameter. When it is not wished to remove the liquid, it is spread over the heap by means of moveable wooden spouts, attached to the pump.

Arrangements such as the above are stated to be now quite common in the south of France. If the subsoil of the situation chosen for the formation of the receptacle should be porous, it must be rendered water-tight by the ordinary means; should this not be the case, a more simple and less costly method can scarcely be devised. The manure can be rendered either wet or dry, as may be wished; the liquid manure can be carted off when it becomes too abundant, or it may be spread over the heap as already named; so that it is not at all requisite to construct a tank of great size. We must agree with the following remarks: "How often in country places have we seen the rain-water filling the manure-yards, and then flowing out—a valuable solution of manures, that might be rendered available by a little proper care and attention!" The manure may be allowed to ferment for some time; if it be horse dung, this is carefully checked, before going too far, by the addition of more manure (to prevent the access of air) and water, until the tank fills, when it is spread over the whole. By this method a heap of valuable manure is *perfected* in about six weeks, the escape of ammonia greatly prevented, and the laborious operation of turning over the heap quite avoided; as the addition of liquid on the top causes it to rot completely throughout.

The above seems to combine three requisites, which are too often over-looked by scientific men; namely—simplicity, cheapness, and effectiveness.

C. E. D.

THE CORN TRADE.

The following useful practical article from the *Banker's Circular* will be perused with much interest at the present moment:—

The history of the corn trade of England is the history of disasters; fortunes gained and kept are so few, compared with fortunes lost and credit wrecked, that the bright and prosperous in the trade are exceptions which mark the rule. If we descend from the general to the particular we shall find the years 1829-30, 1842-3, and 1847, marked [by] extraordinary speculations in corn, which terminated in widespread ruin; and that of these, the year which closes its incidents, its excitements, and its calamities within a few hours, is by far the most remarkable for the extent of the speculation in corn, and the amount of loss sustained by the principal operators. These three conspicuous epochs occurred within the range of our labours as public writers; and on all these occasions we feel that we have steadily done our duty in collecting, with great exertion and anxiety, the best available information, and applying it with care and diligence according to the judgment awarded us. On the first of those occasions the most conspicuous man in the corn trade said that our writings had saved him and his friends £10,000; on the second he said, if this publication had been taken generally in the corn trade, abroad as well as at home, the three or four millions sterling lost by corn in the years 1842-3 would not have been lost; on the third occasion we had the misfortune to differ from him, or perhaps it may be more correct to say, he had the misfortune to differ from us—enormously, regarding the result.

Neither was it on such occasions only that we endeavoured to prevent misfortune resulting in public calamity. Soon after the Parliamentary Committee on Agricultural Distress—a distress produced solely by the low prices of 1835—had terminated its labours in 1836, and they were great and remarkable, we began to give note of coming deficiency in the supply of corn; we continued to do so throughout the years 1837 and 1838, until, in the month of September in the latter year, prices had risen so high as to cause a larger quantity of corn to be liberated from bond than in any other month in the history of the corn laws. Then the press abused us as the instruments of corn speculators; and as virulently as certain members of the press have this year abused us for causing "the farmers of England to empty the stackyards," and preventing adequate supplies being brought to our shores to avert a famine. To such annoying treatment public writers must, we fear, be ever exposed; and those who cannot bear it with equanimity of temper are not fit for the occupation. We claim a right to refer to such circumstances when time and events have supplied the test of truth. So long as we write at all for the public we intend to write with the authority that legitimately belongs to a character acquired by twenty years' diligent application—always professing a desire and intention to retire from the field whenever a writer appears on the stage who will handle the questions of corn and currency in a manner useful and beneficial to the public; one who will more especially attend to and faithfully report their combined operation and results on the public

welfare. When claiming the attention on these topics, which properly appertains to long service, and no more, we at the same time profess a readiness to admit any error we may commit on either, whenever events, or the force of circumstances, shall demand the admission.

It may be proper at the outset to notice some circumstances which appear to us calculated to abate those uneasy feelings respecting the supplies of food for the eight months intervening between this day and the first of September next, which afflicted us as well as other inquirers two months ago. The small store of potatoes seemed then likely to be diminished rapidly by decay. The disease, however, does not continue its ravages in the ratio then threatened. In Yorkshire and all the northern English counties their quality is good, and the price, though high, is not extravagantly so. Even at Glasgow they are sold by retail at a penny the pound—14d. for a stone of 14lbs., which is just about the same as in London. Then the fine growing autumnal weather has made an unprecedented change in the stock of turnips. Fields which in August showed nothing but a scanty produce, are now filled with the finest bulbs we ever saw. And we hear of crops in Scotland and Ireland yielding a weight which we hardly dare repeat, being assured that from thirty to forty tons to the acre is not this season an extraordinary produce. In some parts of Ireland turnips may be bought as low as ten to twelve shillings the ton. This unexpected additional supply of a singularly prolific root will prove a valuable auxiliary for four months; for although the common white and yellow turnips are, as human food, very inferior to the potato, the Swedish turnip has not much less nutritive power.

While upon this point we must be allowed to digress a little for the purpose of again endeavouring to stimulate the culture, and the improved culture of turnips. A century ago it was a root scarcely known to British husbandry; it is hardly yet known to the farmers of many parts of Wales; ten years since it was as little known in Ireland. The Scotch are in advance even of Norfolk in its scientific cultivation. They consider which of a variety of different sorts is best adapted to a given quality of soil; which will pay the best for sale to feed sheep, or fatten cattle, to force the yield of milk from the cow, or sell for human food in towns. They select the seed according to these several objects. In the course of its growth to maturity they keep the rows more distinct, well hoeing the soil between them. The difference in the value of the crop, according as it may be adapted to any of these purposes, is sometimes several pounds by the acre; and any farmer living within six miles of a good market and large population, may avail himself of one or all. Then, the extent of surface applied to the growth of turnips in Scotland is extraordinary. We understand that many farmers devote one-fourth, one-third, and in rare instances one-half of their whole farm to raising turnips. By this they are enabled to send so much beef and mutton to the London market. We learn from a scientific collector and distributor of seed for turnips and other edibles, as well as corn crops, that the quantity of land applied to the production of turnips in Scotland is not less than 500,000 acres. His professional pursuit enables him to ascertain that the quantity of seed annually sown is not less than 50,000 bushels. The proportions he thus distributes, viz.,

Of Swedes	15,000 bushels.
Yellows	25,000 ,,
Whites.....	10,000 ,,

And by reckoning one bushel as sufficient for ten acres of ground, he obtains a statistical fact of more satisfactory accuracy than has been furnished us by our Board of Trade or Royal Agricultural Society for any department of agriculture in England. If these 500,000 acres yield 20 tons to the acre, worth on an average 16s. the ton, here is an annual produce of turnips in Scotland of the value of eight millions sterling, or about two-thirds of the annual value of the far-famed cotton crop of the United States, so skilfully handled and accurately reported by statisticians.

The reflection upon this fact is interesting and important. Our rulers are become ridiculously jealous of the Scotch system of Banking and currency; they alarm themselves with most absurd and effeminately superstitious fears for the consequences of allowing it to remain uncorrected and unregulated, although they admit the Scotch Bankers have for a hundred and fifty years proved by their practice perfect capacity and unimpeachable integrity and judgment in regulating it for beneficial ends themselves. That system is more closely connected with Scotch agriculture than any system of Banking and currency is connected with any other distinct branch of industry in the world—not excepting the Bill of Exchange system of Lancashire. Our rulers admit and many of our English territorial lords employ Scotch agricultural skill. But one and all fail to connect eminence of scientific cultivation of the soil with its main cause, which is the fostering of the growth of capital by usance given to the thrifty in the most easy unexpensive manner by the Scotch Banks, and its economic distribution to the uses of industry — principally and almost exclusively within the limits of their own naturally sterile country. To Norfolk belongs the honour of having first introduced the turnip into British husbandry, but to Scotland belongs the higher honour of having brought it to greater perfection in the cultivation and extensive application. Improved drainage, which upon many soils is an indispensable necessity in the successful cultivation of this root, also belongs to Scotland. You have but to pass through the country, and see the draining tiles lying upon land which in England would grow nothing but rushes (and in Scotland too heretofore), to be convinced of the superior energy of Scottish agriculture. Where you see one field in England under the process, you see five in Scotland. This, and all the results, we repeat, are mainly to be ascribed to the easy access to capital which the Scotch farmer, whether on a large or a small scale, can at all times command. Our rulers are bent upon injuring this source of local wealth and prosperity; and we wish to know from the members of the Select Committee just appointed whether they will supinely and with disre-

putable subserviency permit our rulers so to act. Their duty is to strengthen and give freedom to a system which yields such results.

On entering on the corn-trade question, the first thing that merits our attention is the astounding statement of the Chancellor of the Exchequer describing the money value of imported corn. It was given in these words :—"In the first place, I will refer to the sums paid for the purchase of foreign corn. I wish the House to observe that, with regard to corn, as in the case of railroads, the abstraction of capital has proceeded in a most rapidly increasing ratio. I have a rough return prepared by Mr. Porter, whom I desired to collect the result; and he has done it, as I believe, with very great accuracy. The cost of corn imported from June, 1846, to the 5th of January, 1847, was £5,139,476. The cost of corn imported from January to July 5, 1847, was £14,184,000; and the cost of corn imported from July 5 to October 10 (only three months) was £14,240,000. (Hear, hear.) This is a statement of the cost to the importer. It will be seen that the cost for the three months ending the 10th of October was greater than that for the preceding six months. But, during those three months the pressure in the money-market was the greatest, and may not this extraordinary amount of money paid for foreign corn account, in a great degree, for that pressure? Here, then, we see, that no less a sum than £33,563,476 was expended for foreign corn within the space of fifteen months." The measure of imported corn is what may be ascertained with precision; the cost can be nothing more than an estimate, and we should like to be informed on what it proceeds. Does it include the freight—the freight to London for example, and afterwards from London to Cork? Is the freight from the Government store at Plymouth to the Government store at Limerick reckoned as part of the cost? The explanatory words are "cost to the importer." During the fever rage of speculation 16s. to 18s. the quarter were paid for the freight of wheat from New York to London, 18s. to 20s. from Alexandria, higher still from the Danube and Black Sea. No doubt, therefore, the freight would be one-fourth of the cost, which at an original price free on board of 40s. the quarter—an enormously high estimate for all kinds of grain inclusive in the aggregate—would assume only 10s. the quarter for freight on the average. Even at this computation of one-fourth for the freight, £8,390,869 must be struck off the Chancellor's statements, so far as the argument involved in it is concerned, as being in great measure a mere transfer from the pocket of the corn speculator to the pocket of the British ship-owner. This would leave £25,172,607 as the cost of imported corn paid to foreigners in the specified period of time.

We have no doubt that this sum of twenty-five millions sterling is far too large an amount to be counted as capital abstracted from the country to pay for foreign corn; and that, if it could be ascertained, twenty millions for fifteen months, or at the rate of sixteen millions for a year, would be found much too high a sum reckoned as the amount so expended, over and above what has been annually expended on the average for foreign corn during each of the ten years 1838 to 1847 inclusive. The following return just published by the House of Commons seems to throw light upon the point.

"*The Corn Trade.*—Some interesting statistical information is given in a Parliamentary return (yesterday printed) of the importation of foreign grain since the passing of the Corn Law Repeal Act (9th and 10th Victoria, cap. 22) on the 26th of June, 1846. From the 26th of June to the 5th of November, of wheat and wheat flour there were—5,281,814 quarters imported (4,609,334 foreign, and 672,480 British colonial), whilst the quantities entered for home consumption in the United Kingdom in the same period were, 7,229,916 quarters (6,547,656 foreign, and 682,260 British colonial); of barley and barley meal in the period there were 1,038,981 quarters imported (1,034,868 foreign, and 4,113 British colonial). The quantity entered for home consumption was 1,859,348 (1,155,218 foreign, and 4,130 British colonial). Of oats and oatmeal the quantity imported was, 2,238,088 (2,169,240 foreign, and 68,848 British colonial). The quantity entered for home consumption, 2,438,799 (2,369,774 foreign, and 69,025 British colonial). Of rye and ryemeal the quantity imported was 267,832 (267,756 foreign, and 76 British colonial); the quantity entered for home consumption, 267,875 (267,799 foreign, and 76 British colonial). Of peas and peasmeal there was imported 276,007 (237,622 foreign, and 38,385 British colonial; the quantity entered for home consumption was 306,304 (267,338 foreign, and 38,966 British colonial). Of beans and bean-meal the quantity imported was 496,827 (496,604 foreign, and 223 British colonial); the quantity retained was 579,141 (578,918 foreign, and 223 British colonial). Of Indian corn and meal the quantity imported was 4,300,427 (4,291,868 foreign, and 8,559 British colonial); the quantity entered for home consumption was 4,313,413 (4,304,854 foreign, and 8,559 British colonial). Of Buckwheat and meal the quantity imported was 45,299, all foreign; and the quantity entered for home consumption was 45,995 foreign. Of bere and bigg the quantity imported was 491, which was entered for home consumption. Under the head 'Aggregate of all sorts,' the quantity (foreign and colonial) imported was 13,945,766; the quantity retained for home consumption (foreign and colonial) 16,341,282 quarters. The importations have been reckoned from the 26th of June, 1846, when the Corn Law Repeal Act came into force, to the 5th of November last."

We append to this a return moved for by Mr. Cayley, which includes the month of October, one of enormously large import of grain, while Sir Charles Wood's statement came down to the 10th of October only.

"*Foreign Grain.*—An account moved for by Mr. Cayley shows the quantity of grain that has entered the country under the operation of the act of 9th and 10th Victoria, cap. 22, commonly called the Corn Law Repeal Act. It appears that since the passing of that act, up to the 5th of November last, 7,229,916 quarters of wheat and wheat flour (chiefly foreign produce), 1,159,348 quarters of barley and barley meal, 2,438,799 quarters of oats and oatmeal, 267,875 quarters of rye and rye meal, 306,304 quarters of peas and pease-meal, 579,141 quarters of beans and bean-meal, 4,313,413 quarters of Indian corn and meal, 44,995 quarters of buckwheat and meal, and 491 quarters of bere or bigg, were imported and entered for home consumption in the United Kingdom, making a grand aggregate quantity of all sorts of grain consisting of 16,341,282 quarters."

This return comprises that quarter of a year succeeding the

passing of the Corn-law repeal Bill, when prices of all grain were low—good wheat having been delivered free on board at Yarmouth for 43s. the qr. in the month of August, 1846. It describes an import for the whole period, ending Nov. 5, or a month, an important month, more than the Chancellor's statement. Of these 16,341,282 qrs. no fewer than 9,111,366 qrs. consist of barley, oats, rye, peas, beans, maize, buck-wheat, bere, and bigg—7,911,560 qrs. of that quantity being barley, oats, and maize. It surely would be reckoned a high estimate to take the average cost of these 9,111,366 qrs. at 30s. the qr., which would give a total cost of £13,667,049, exclusive of wheat. This leaves £19,896,427 for the cost of wheat, or more than 54s. the qr. on an average, to make up the sum stated, even including the large import from Oct. 10th to Nov. 5th. Anyhow we cannot but regard the estimate of £33,563,476 as extravagant. If the expenditure be so great as that, the loss to the corn trade cannot be less than eight millions sterling; and we have never heard it stated at more than six millions, or about double the sum lost by the same trade in 1842-3. We know that some Banks invariably decline to take corn-bills, or bills drawn on consignees against consignments for sale; and it is very desirable that such a practice should not spread itself, for that trade is as legitimate as that of cotton, silk, sugar, or indigo, and more necessary than all. Therefore we thought it necessary to express our dissent from the official estimate of value expended in foreign corn.

It is hardly worth while to stop for the purpose of marking the folly and presumption of those writers who maintained that no large additional quantity of foreign corn could ever be procured on an emergency; that the produce of corn in all countries was a given quantity, about equal to the consumption of each, with but little to spare for export. England obtains 16,341,282 quarters in about sixteen months, at a period when France, Belgium, and other countries were competing with England, for supplies. But it is worth while to show that if the Chancellor's estimate be an approximation to accuracy, the price must have been a high average one that causes such a result. The prices we have assumed to account for any amount near to this total value are considerably higher than those which could be now obtained for imports of corn of the average quality of such imports; and therefore prices must either rise here, or fall in the markets of supply, before any large quantity of foreign corn will be brought to our shores during the ensuing eight months. For example, wheat and wheat flour are at present too high on the seaboard of the United States to send to England at a profit at our existing prices. From their great eastern cities they sent to Europe all that could then be spared; in proof of which a considerable quantity of wheat was imported from Canada into the United States, paying a duty on entry of 8s. 8d. the quarter. On asking the intelligent Canadian merchant who gave us this information, how much he estimated the quantity to be which was so imported, he said it might be not exceeding 20,000 or 30,000 quarters, but he did not know the exact amount. Let this fact be noted by those who have always contended that no people would consent to pay a fixed import duty on corn. We think our existing corn-law, sliding from 4s. to 10s. the quarter, better than that of the United States—25 cents the bushel, or about 8s. 8d. the quarter.

This reference to the question of price leads us to conclude there can be no great importation of corn for four months, not until the inland navigation of the United States and the northern ports and seas of Europe are free to bear their burdens forward to distant shores. We consider the produce of this year's harvest will prove, on the whole, as good as we formerly reported. Barley, and, in some sections of the country, wheat, do not yield by the acre so well as the farmers expected, but still there is no room for discontent concerning those crops; oats in Scotland yield well, and they are of fine quality and great weight, 44lbs. the bushel being not an unusual weight. Farmers are in good plight, and will not sell their corn produce at low prices without keeping it for a considerable length of time for better prices. We believe they have brought less to market in proportion to their harvest stock than was ever known. Cargoes of old wheat have been this month shipped from the eastern counties of England to the north, and to Scotland; but the quantity of old now remaining in the hands of the farmers must be growing extremely scanty. We merely note the fact as illustrative of our former reports on this point. On the whole, therefore, we consider the stock of all kinds of grain in the hands of producers and dealers satisfactory; and that this element of the case, together with what we have said of the open weather of the last three months, and its consequence on the crop of turnips, must be of sufficient weight to remove some of the apprehensions formerly felt concerning supplies of food.

From the best consideration we can bestow upon the matter, it appears consequently to us that it is quite safe to hold stock at the average price of wheat and barley for the month of December. At the same time we think the farmers will bring forward supplies freely enough to prevent any considerable rise, especially if severe weather, which seems at last to be setting in, should continue for several weeks. We have very little to say on the question of prices; the pivot of 54s. for wheat, fixed on by us as that which would most nearly mark the range of prices from September to the close of the year, is now proved to have been as accurate as can ever be expected to be exhibited by the operations of the corn trade. We think the ensuing four months will, on the average, mark a somewhat higher range of prices for wheat and barley, but not one greatly in advance of that which has prevailed since September. We must wait to see the course of prices in other countries before we shall feel warranted in coming to any different conclusion. The wants of Ireland may enhance the price of Indian corn, but will exercise but an inferior bearing on the value of wheat.

"It is too early to speculate on what amount of corn may be brought to our shores, not by English capitalists, but foreign. That which is now arriving from the Black Sea must be the result of prices which obtained in England up to the month of July inclusive.

THE LAND STEWARD.

(FROM A CORRESPONDENT.)

(Concluded from page 27.)

The duty of the farm-bailiff is to arrange and direct the whole processes of the farm, after consultation and concurrence with the farmer himself; for this purpose he must see his employer in the evening of each day, and jointly make the arrangements for the next in every minutest detail. If wet weather or any unforeseen accident should happen to disarrange the concerted operations, the bailiff must make fresh arrangements from his own discretion; or he must go early in the morning to the bedroom of his master, and again take the proper measures of proceeding. Some prefer the custom of the bailiff always going in the morning to the bedroom of his master at a stated hour, which renders unnecessary any arrangement on the previous evening. It is necessary that the bailiff be in the stable at 5 o'clock in the summer mornings, which commence on the 1st of March and end on the 1st of October, or after the harvest is concluded. His appearance in the stable must not be later than a quarter past five o'clock in the morning, when he meets the ploughmen, and gives out to them, from a locked chest, of which he keeps the key, the oats for the horses, which are then given them before going to work, and the quantity to be given at the mid-day interval is put into nosebags for the horses, with two of which each ploughman is provided. Allowing half an hour for the horses to eat the feed of oats, the teams move from the stable at a quarter to six o'clock, and arrive in the field of operations about the hour of six; they proceed till eleven o'clock, resume at one o'clock P.M., and labour till six in the evening, making ten hours of labour. In many places the hours of labour are from seven to twelve o'clock, and then from two P.M. to six, making nine hours of labour; and it must be acknowledged that as much work can be done in nine hours with well-fed horses, with the proper arrangements, as in ten hours with dull and abused animals and long adjustments. This arrangement also affords an hour of more time in the morning, in which to collect the working materials more systematically, and to arrange everything more correctly. During the time in which the horses eat the morning feed of oats, the bailiff gives to each ploughman, "singly," the directions for his employment for the day; and so soon as he sees all the teams go to work, he turns his attention to the arrangement and direction of the day-labour by men, women, and boys. After every order is given and acted upon, he himself takes the direction of the "gang" of lads and women, who may be employed in hoeing and weeding; and by as constant an attendance as possible, he procures the duty of this branch of operators as firmly and steadily as conciliatory lenity will allow. From this employment he must go twice a day, or once in the forenoon and afternoon, to see all other branches that are going on—the ploughing, the digging of ditches, and the cleaning of roads and hedges, and everything in the shape of work; and returning rather quickly to his most necessary occupation with the "trifling" day-labourers. In directing and superintending all these operations the proper sense of duty must be the ruling principle, but ever banishing from that strongest sense every feeling of harhness that would abuse a fellow-creature. When the required performance is duly explained, and after such explanations it is repeatedly neglected, the far better way is to dispense with the future services than ever once to resort to harsh measures or to a savage oppression. Such treatment does most completely alienate the human heart, and perverts the kind and generous affection which tends so powerfully to generate and promote the reciprocity of kindly feeling and of benevolent action, that forms by far the most beneficial and most durable cement that can solder the different branches of society.

The bailiff should again see all the teams of horses leave the stable at a quarter to two o'clock, and then proceed himself to the superintendence of the "gang" of day-labourers, with whom he remains till six o'clock at night. He gives directions where the work will be on the next morning, and explains if any change is intended. He then goes to the stable, and gives to each ploughman the allowed feed of oats to the horses, hears every observation that may be made to him on any subject, and helps and remedies, as far as in his power, the chances and occurrences that almost hourly happen in such employments. This hour also serves well for the shepherd's meeting both the master and the bailiff, and concerting together the arrangement and management of the flocks. During the summer working season more than an hour will be thus occupied beyond the time of ceasing from common work, and this "extra" occupation

renders it necessary that the bailiff have an additional pay.

On farms of the larger size, and exceeding 400 acres in extent, it is reckoned necessary that the bailiff be not confined to any standing employment, as the superintendence of the day labourers, but that his time be wholly free for a general overlooking of all departments. Under this arrangement a steady workman of a superior intelligence is selected to closely superintend the day labourers, and in winter he feeds the thrashing machine, and directs the winnowing and measuring of the dressed grains. When neither day-labour nor the thrashing of grain is going forward, this person is employed in trimming hedges, and in putting gates into repair, and such similar extra jobs. During the season of sowing of the grain crops he forms a constant operator, and takes care that the work is properly performed. The sowing of the turnip-seed from the drill machine is entrusted to his charge. This person frees the head bailiff from the most troublesome part of the farming drudgery, and usually gets about one-fifth more than the wages of common labour. When such a person is employed, the head bailiff is wholly at liberty for the purpose of general superintendence, and his daily duty will consist in visiting twice a day all the departments of operations that are going forward. In the morning he must accompany to the field the teams of horses, and see his orders being put into progress; and hence he will go to the daily labourers, and find that the work is steadily and properly done; and if no other object calls his attention, he may again return to the horse-labour department, and see the performance till the hour of dinner. After two o'clock the same process of constant overseeing and direction must be repeated, varied occasionally by accidental interruptions.

In addition to the constant vigilance of the hired agents of surveillance, it is necessary that the farmer himself be very actively employed in seeing that his various orders and directions are duly arranged and properly performed. For this purpose, the morning's walk before breakfast may extend to the neighbourhood of the farm-yard and buildings, and he will thus learn that the working animals and people have gone to their respective employments, and that no disorder or loiterings have taken place. Before the hour of ten in the morning he must be on horseback, and proceed to the nearest locality of work that is going on, which he will recollect from the arrangements that were made with the bailiff in the morning. He will go from one department to the nearest in his way, and thus go the round of the whole employments an hour before the time of dinner. And upon every occasion he must correct any impropriety of attention or execution, and commend freely where the performance requires it. On large occupations, a similar round of examination is necessary in the afternoon, and as often as possible in every day of the week. In the arrangement and conduct of all operations, nothing is so very essentially necessary as regularity and steadiness—the first being required to arrange the proceedings, and the second in carrying them forward at an uniform rate. Experience and reflection are indispensable to any person who pretends to systematise the order of the proceedings, for an improper adjustment in one single point will destroy the efficacy of any arrangement. Combination of the force that is employed, is the grand point to be held in view in making the arrangements of employment; and though it be the most valuable secret in such matters, it is almost wholly neglected. A force that is scattered on many points, produces no result in a certain space of time; the termination is too distant, by reason of an inadequacy in the operating agent. Bad weather often happens, and catches and spoils very many operations in an unfinished state, and of which the greatest value is thus lost. On the other hand, a force being combined on one point "singly," carries forward and finishes one branch of business after another in the least possible time, and to the greatest advantage. The combination of the force has a magical effect on the spirits of the labourers themselves; and by being very quickly finished, the business is removed beyond the risk of accidents that constantly happen in farming, which is so very much exposed to the influence of adventitious circumstances. The most particular and minute attention must be paid to this golden truth in distributing the order of the operations: circumstances will daily occur to render unavoidable one or more separations of the force employed—but as few divisions as possible must be made. Small bodies in action necessarily create a languor of execution, and a depression in the spirits of the labourers; and a number of divisions render the office of superintendence much more laborious. A force acting together most naturally inspires a spirit of exertion, promotes a valuable cheerfulness, and vastly increases the power and the quantity of performance. Co-operation rouses the bodily powers, and the one part of a systematic arrangement of procedure pushes forward the preceding, and induces the one behind it to follow its progress. Common observation will, in every case, confirm the truth now stated.

The ploughs must be kept all at work in the same field; and when the field is nearly finished, the ploughs must move to another in the order of their respective lots of work being terminated, the

one that is last in order being always left to plough the headlands or the spaces of ground at each end of the field on which the ploughs turn; and this plough follows the others, so soon as these headlands are ploughed. In cross-ploughing, and in fallowing lands in the spring, it is necessary that the fields be marked out into spaces of twenty or thirty yards in width, which is done by a skilful ploughman performing that work in due time for being ploughed. Thus no delay happens when the ploughs go to a field, by reason of the want of marks to direct the operations. The bailiff must be most particularly careful that no "stand-still" of the smallest kind ever happens from want of orders—a stagnation shows an utter imbecility, and a total unfitness for such an office. His directions to each single servant in the morning must be clearly given, and most intelligibly understood. During the seasons of sowing seed, which are the most critical of the farmer's attention, it is most essential that the force be combined in performing one operation, in order that the time and attention of the bailiff be not distracted and diverted from the one proper object. The land intended to be sown with oats is most generally all ploughed in readiness before the sowing of the seed begins, and then the whole animal strength must be employed in harrowing. For this purpose the harrows completely repaired for some time previously, should be conveyed to the inside of the entry gate of the field on the evening previous to their being required, and laid down regularly in working order; and each ploughman having before "marked" his own pair of harrows, finds them in readiness, and without delay gets into work. One or two or more carts, of two horses each, convey the seed to the field, and proceed to the side where it is intended to begin, and lay down the bags across the field in two rows or in one, according to the size of the field. The sowers enter without delay, the bailiff being one, who keeps a watchful eye that the work both of sowing and harrowing be properly performed. Two pair of common harrows being allowed to each sower, in giving the land a double tine lengthwise, the process of sowing and of harrowing will be finished nearly together, when the cross-harrowing of the land immediately commences. The sowers retire to other work, the bailiff visiting occasionally the work of harrowing, gets more seed put into bags for the next field that is to be sown, and gives directions to the ploughmen how and when to proceed to it. His presence is ever most necessary at the commencement and the finishing of distinct operations; for at these times prattling and trifling are most apt to take place. The harrow-sledge must be in readiness outside the gate-way, on which he must see the implements placed, by being unhinged and separated, and conveyed forthwith to the next place of operation; and when they arrive there, his business again is to see them put forthwith into action. And he must be ever watchful that the transfer of force from one application to another be quick and expeditious, prompt and steady.

In the sowing of barley, a different mode of proceeding is necessary, as the ploughing of the land is done at the season when the seed requires to be sown. The ploughs having done one day's work, on the second morning one sower enters, followed by two or three pairs of harrows, and finishes all the land ploughed on the day preceding. On large farms the ploughs will employ one sower and two pairs of harrows, and thus the land is sown so soon as ploughed. The bailiff may be this sower, or he may appoint a steady ploughman who is hired for the purpose, and can put a lad to the harrows with his pair of horses. His time will thus be wholly free for superintendence and direction. His constant presence is necessary, or with as few visits elsewhere as possible. By giving the land three or four double tines of harrowing, five ploughs would employ one sower and two pairs of harrows, after giving the ploughs one day's advance. It is most essential that the seed of barley be sown immediately on the land being ploughed, in order that the moisture be preserved in the newly stirred ground, and that the benefits may be got for the seed, of the combinations that take place between the atmospheric and terrestrial elements, and which have been found very powerfully to promote the growth of vegetation. So soon as a field is finished, or half finished, by ploughing and harrowing, the roll must be applied across the field, and thus secure the use of the moisture in the land by breaking the clods, levelling the surface, and presenting a flat impenetrable surface to the influence of drought and the sun's rays. The roll should not be under one ton in weight. For the purpose of directing all these combined operations it is better that the bailiff be not engaged in any operation, but be wholly employed in making arrangements and in giving directions. In the sowing of barley, the fields require to be marked into spaces of a certain width, in order to direct the ploughing; and this purpose is effected by a skilful ploughman on the day of ploughing, or on the previous day, the arrangement of the different parts always allowing so much advance of one operation before another, as that no stoppage can happen. This point forms one most important part of the bailiff's employment.

During the very important time of sowing turnips, the bailiff will have a most busy employment in arranging and directing the operations of that

most valuable of all the various processes of cultivation. The making of arrangements and the performing of the various intended operations are quite different things, though they seem to be very closely allied to each other. The latter is much the more difficult task, as many obstructions occur to which the former is not exposed. Many very excellent arrangements fail in the execution from want of the energy and invincible obstinacy that are necessary to foresee obstacles and to surmount them. In farming there is no alternative but to get the work forward in the proper season, and hence the necessity of the most unceasing energy and activity being displayed, and in a greater degree than many other occupations demand. The whole force of the farm must be in one field, so as to be always in view; and the bailiff must be wholly disengaged from any manual operation, in order to keep every arrangement in the proper state, alter where necessary, and add where required. He must be constantly moving to and fro on the field, and allow not one single operation to escape his inspection. In transporting the force from one field to another, the utmost vigilance and forethought must be used, that no delay may occur at that most important of all the periods of the year. The drilling ploughs being the foremost operators will move the first in order to the next field, after getting the necessary directions from the bailiff how to proceed; he himself will remain the last on the field being finished, to see the proper termination, or he may leave some trusty person in charge of that department, and proceed himself to the newly commenced field. Nothing more thoroughly shows a mastery in the business than the adroitness that is shown in the transportation of force, and the adaptation of it to the finishing of one branch of work and the beginning of another. A nicety is required that is very different from the more clumsy process of directing the force in *cumulo*, and both absolutely require an expertness that can only be derived from reflection and experience.

During hay and corn harvest the bailiff's occupation must be the getting the crops prepared for being carried and housed, and then the direction and superintendence of the force that performs the operation of securing the crops. At these times it is necessary that every point of action be very sharply moved; and as no person can be present everywhere, some trust must be placed at the corners where the loading and unloading take place; and the bailiff by constantly moving from one point to another will keep the whole machinery in action, and re-arrange and adjust where there is any occasion.

There is not any part of the office of a farm-bailiff more important or more imperative than the keeping in working order all and every implement on the farm. For any neglect on this point there must be no excuse; arrangements must be made for the regular work of a carpenter and a blacksmith, and when any implement is worn out it must be replaced, and when broken it must be mended. The want of the *materiel* of action baffles operations of every kind; if the sinews are necessary to constitute strength, the keeping of them in trim is equally essential to the systematic and profitable performance of agricultural operations. Every tool of any kind must always be found in complete repair, and on no morning of the year must any delay take place on account of the implements being deficient in any necessary part. Every workman must report to the bailiff when any casualty happens, and this information being conveyed must be made a most imperative clause in the agreement of employment; and the bailiff, upon being informed, must without delay have a deficiency filled up. Without a systematic order being laid down and enforced in all active and combined proceedings, irregularity and confusion ensue, and a most hurtful dilatoriness pervades and obstructs the procedure of every operation. A place must also be appointed for the keeping in store for use the implements and tools on the farm; the cart-shed protects the larger implements, as carts, harrows, and rolls; and a house on the end of the cart-shed contains the tools of smaller size, as spades, shovels, picks, hammers, and ropes, the key of which is constantly carried by the bailiff; to the door of this house every workman on the farm must bring any tool which has been given him, when he has done with the use of it, and the bailiff at convenience places them in the house; and on every morning, when any working tools may be wanted, the bailiff attends to give them out, and takes an account to whom they are delivered. The implements that are in daily use will also be under the bailiff's care: the dung-forks, shovels, and brooms, that are used in the stables, and the forks and rakes that are in the hands of the cattle-feeder. The barn implements must be kept in the most complete repair, and the sacks must never show one single hole. All articles of every description must always be found in complete order and ready for use, or confusion and delays will happen which very much impede and retard the operations of the farm. The very smallest neglect on this point, on the part of the bailiff, shows the most complete unfitness for the office, and the employment of such a person will only tend to loss on the part of the farmer, and to the disgrace of systematic farming. Next, if not equal in value to skill in making the proper arrangements, is the carefulness that the muscles of operation are ready and alert. Without the latter pro-

vision the former quality must go for nought. The farmer must provide the necessary materials, and upon the bailiff depends the care of upholding them in constant and efficient readiness; and such provision must not be done by fits and starts, but in an orderly and constant manner that knows no interruption nor brooks any delay. As the bailiff oversees the whole labour on the farm, so the farmer must superintend both, and observe most narrowly if his orders be obeyed and his directions fulfilled. If he sees any defalcation, he must repeat his orders; and if they be still neglected, he will be under the necessity of changing his agents of action. But it is better when the system is laid down in such a manner as to be easily understood and capable of being readily performed.

The last consideration, but by no means the least, is the policy of always having the labourers ready and willing, spirited and active. In order to procure and retain the willing energy that is most essentially necessary to the advantageous furtherance of any project or undertaking, the allowance in wages must be stretched to the very utmost degree of liberality which the circumstances of the social condition of any country will allow; and even if the verge of the general amount be transgressed, no loss whatever, but a positive benefit, will ensue. Self-interest is the most powerful of all the springs of human action; and the labourers must not be regarded as so many machines, for the use of which the farmer pays a certain cost per day, but as operators in the same undertaking as himself, and participators in the result. Every encouragement that is in the power of the farmer to bestow must be given: attention to the condition and comfort of their dwellings, encouragement and assistance in the cultivation of the garden ground, and the kind remembrance of the rising offspring in making arrangements for procuring the necessary youthful education. These attentions never fail to tell with redoubled force on the promptitude and energy of labour, when the emergency requires the exertion; for, in nine cases out of ten, a kindness or favour bestowed is rewarded by a return in kind. And also in making the arrangements of labour, and in taking the necessary steps for securing the execution, the most blandiloquent conciliation must be used, without one single exception, in the constant intercourse that must ever exist between the employer and the employed. Compulsion only serves for a time, and harshness alienates every affection of the heart. A harsh bailiff will lose his master many acts of returning kindness; and accordingly the farmer must keep a very sharp look out, in order to detect and rectify the smallest resemblance to the exercise of a harsh authority. When reproof is necessary, it must be gentle; and when commendation is required, it must be abundant and yet respectful. Encouragement leads mankind, but harshness and brutality produce obduracy and retaliation.

In enlightened communities no out-door work should be performed by females. The quality, as well as the quantity of work, has a very visible effect on the human frame, both mental and bodily; the woman is unsexed into a beast of burden, and destitute of the beauty and delicacy of a female, and devoid of the strength and decency of a man. Light work on the farm, as the harvesting of hay and corn, the hoeing of turnips, and the barn work in winter, is mentioned as tolerable; but it may be observed that all out-door work has the most certain effect of vitiating the female character and debasing every finer feeling. No better criterion of the civilization of a people need be required than the general treatment of females, in the respect which is paid them and the estimation in which they are held. Any debasement must be avoided and even prohibited. The degrading services to which Nature's finest work is yet exposed in the British Isles show that the "cursed lust of gold" is yet predominant, and that the employers have not yet got beyond the character of being "God's image rudely etched on base alloy."

SHEEP FARMING.—At the last meeting of the South Devon Agricultural Society, the Rev. W. Cosins said that in that county sheep farming seemed but very little understood. It was admitted as a matter of fact that the chief expense in raising wheat was the labour and manure; and he asked them to consider what an enormous quantity of labour and manure they could save by sheep farming. Look at the short steep hills in this district, where a couple of wretched horses were employed in dragging five cwt. of manure up the hill, and see the labour and expense they would save by folding their sheep on the ground. The principal expense of the Devonshire farming was the horses, and if more sheep were kept, less horses would be required. He had lately visited the farm of Mr. Sotheron, one of the members for Wiltshire; he had a farm of two hundred acres, on which he had six hundred sheep, and he was going to Weyhill fair to purchase two hundred more. His sheep were not running over the meadows, but kept on turnips and artificial food, and it was well worth their while to try the experiment of mixing with their turnips a certain portion of oil-cake, or hay cut into chaff, and the improvement would surpass their belief, besides making the manure much more valuable, and thus adding to the fertility of the soil, and producing heavier crops of wheat. He mentioned these things, and insisted on the fact of eight hundred sheep being kept on two hundred acres of land, to show what could be done by artificial farming. —Sherborne Journal.

HEREFORD CATTLE, THEIR COLOUR, FORM, AND BREEDING.

Though of the least importance, I wish to consider, first, their colour. Both light and dark colours have been at different periods in general estimation, as the caprice of fashion has ruled, for there is not in reality any sound reason for the rejection or adoption of either exclusively. Mr. Andrew Knight was favourable to light colours—grey or yellowish red—and as he may not be supposed to have given a preference to them on purely fanciful grounds, he is known to have entertained the opinion that they are the quickest feeders. The darker colours were at one period much approved, and by eminent breeders: among them may be mentioned Mr. B. Tomkins. Mr. Edward Jeffries had also many very dark in his herd, and a bull of his nearly black was exhibited many years ago at Hereford. I believe there is no rule to be considered of at all general application, as to one colour being more hardy than another in the breed of Herefords. One reason why light reds or yellows are often less in esteem, may arise from the fact that cattle, when in a state of disease, become lighter in colour. Many persons also entertain an opinion that grey or roan is a colour indicative of delicacy; but, I would ask, is it so considered among the short-horns? There is at the present time, perhaps, more prejudice about colour than at any former period. On what reasonable grounds is it that the white-faced is preferred to the mottled? This point may be conceded to the farmer, that a herd of them exhibit a more desirable uniformity: but a similarity in size and form would be a higher aim and a more important acquisition, and in the advocacy and adoption of either colour to the exclusion of the other the faults prevailing in each are often disregarded, and opportunities of reciprocal improvement lost sight of. Mr. Andrew Knight has stated in one of his publications that it is probable the first specimens of the white-faced breed were imported from the continent; some cows of that colour having been introduced into the county by a Lord Scudamore, and the supposition seems to be something strengthened by the variety having only become numerous in the last century. Those who are so strongly their advocates should be prepared with some better cause for their preferences than their becoming fashionable. It would also be desirable we should know what is the cause that of late the buyers of this breed, for the purposes of stock, are grown so fastidious as not to allow of a tinge of black about the head, neck, and legs, when it can be well ascertained that some of the best and finest specimens of the old Hereford breed have been so marked, accompanied, too, with black noses; against which there is also much prejudice existing among many. I never heard that the eminent breeder, Mr. Benjamin Tomkins, was in the habit of rejecting a good animal on account of its colour; and, perhaps, there have been none of equal eminence whose attention was less directed to that point. But if he had a preference it was perhaps to the grey, a colour he began with and esteemed to the last. If Mr. Tomkins was a disregarder of colour, so also was Mr. John Price. He selected of Mr. Tomkins all the three varieties of colour in Herefords; not that he might possess specimens of each, but finding animals of each variety possesssing the form and qualities he was seeking. From this inattention to colour on the part of Mr. Tomkins and Mr. Price, there are gone abroad many erroneous notions that their breeds were not pure Herefords. Is it likely, I would ask, that either the one or the other, equally tenacious about the pure descent of their herds, and knowing so well the time and difficulty of wiping out a bad stain, should so far commit themselves as to cross too with an alien stock? I consider the idea to have originated entirely from the fact I have adverted to—their indifference about colour.

There is, unfortunately for the improvement of Hereford cattle, too little attention paid to the true principles of form—an object which the late Mr. Price long and unceasingly pursued; and it must be regretted that it is not more appreciated in the native county of the breed, the breeders generally contenting themselves with the possession of a few points which they considered all-important, and which give the animal a striking appearance to common observers—without, however, that proportion of parts which it is so desirable to obtain. But, to go more into detail, I think the formation of the fore-quarter is receiving less attention than it ought; the capacity of the chest in particular, and the ribs which inclose it. The posterior ribs attaching to the loin, the hips, and the rump seem to occupy the exclusive attention of too many. This also, it is commonly thought, must be accompanied by a very soft touch, in preference to one moderately firm and elastic. It is also considered an advantage if the animal is large—a term often erroneously given to one standing on high legs, without corresponding width and depth of frame. Neither is the mal-position of the fore-legs considered of much detriment to the animal; so little attention having been given to the fore-quarter, the advantages or disadvantages of fore-legs, crooked or straight, have not been properly estimated. There has been, too, an anxious desire to increase the width of the hips, often to the sacrifice of other parts, the middle of the loin and the thigh. An attempt also to get the rumps too long leads to a deficiency in the twist—a fault which, I fear, is rather on the increase with Herefords in general. No animal of the cow kind can be called complete in form in which the under points are not so well furnished as the upper; and yet how often we see a striking disproportion! The shoulders in Hereford cattle are liable to but little objection, being for the most part free from bareness along the front of the shoulder blade, and from any unnecessary projection of bone at that part commonly termed the shoulder point. The position of the blade will, of course, vary in obliquity; when that is

sufficient, the upper part of the blade will be better united with the chine and kernel before the shoulder, larger and more developed. The circularity of the pectoral ribs is also greater with such position of the shoulder blade, and the fore flank more prominent. Many give a preference to a moderate shortness of rib. It may often accompany an increased extension of what is (I think erroneously) termed the first rib; but as it represents small intestines, it cannot be supposed to be characteristic of strong constitution; besides, it prevents the flank being placed low enough, which a horizontal line drawn from the elbow will show. The head and neck may be made the subject of a few remarks. In many specimens of good Herefords the neck is placed low in reference to the shoulder, and the head is carried downward in consequence. In cattle, as well as sheep, this form is often accompanied by a fulness of chine, but is disadvantageous to an animal when in a pen with others that carry their heads higher. Many of Mr. B. Tomkins's and Mr. Price's had this growth, and I never heard it objected to on any other grounds. There may occasionally be seen some good Herefords, too, with their heads set on abruptly to the neck, rendering the junction of those parts thin and narrow, and is, I think, an indication of too great delicacy, and consequently to be avoided.

Having been a breeder of Hereford cattle a considerable number of years, and being then resident in the immediate neighbourhood of that eminent breeder, Mr. John Price, it is with less diffidence I offer a few remarks to the breeders of the county of Hereford. I would also wish that any observations I make on the subject, not quite in unison with the general practice of the county, may be considered as offered in that spirit which is best calculated to elicit truth. It is allowed on all hands, I believe, that the properties in which Herefords stand pre-eminent among the middle-sized breeds, are in the production of oxen, and their superior quality of flesh. On these points there is little chance of their being excelled. It should, however, be borne in mind that the best oxen are not produced from the largest cows, nor is a superior quality of flesh such as is considered very soft to the touch, with thin skin. It is the union of these two qualities which often characterises the short-horns; but the Hereford breeders should endeavour to maintain a higher standard of excellence—that for which the best of the breed have always been esteemed—a moderately-thick mellow hide, with a well-apportioned combination of softness with elasticity. A sufficiency of hair is also desirable, and if accompanied with a disposition to curl moderately, it is more in esteem; but that which has a harsh and wiry feel is objectionable. It is generally admitted that the male, having most influence on the character of the offspring, should be selected as complete as possible; and if the herd is extensive, it cannot be expected that one bull will suffice to establish and maintain a good breed. The bull and cow should be appropriated to each other, as far as is consistent with human foresight and judgment; and besides, the bull being selected of a family which has been in repute for good steers, he should also conjoin with that recommendation purity of blood; and if the herd of cows has been selected without any particular reference to that distinction, it is still more important that his descent should have as little stain as possible. That a succession of male animals, so bred, should be kept up by individuals possessing the peculiar faculty for selection, is most desirable; though it cannot be expected to become common—so much skill and experience is required for the task, besides its not being the most lucrative branch of the pursuit. I should remark also, that the size and qualities of the family of the male are of more importance than his own appearance; and a small male descended from large parents is more likely to produce stock of competent size than one having himself a larger frame, but descended from a smaller sized family. It must frequently have occurred to those who have given close observation to the breeding of animals, that sometimes the produce, if unpromising in many properties when young, loses them in after age, and assimilates more to the right standard of form and quality; but this can only be calculated on in well-bred animals—in that acceptation of the term which implies a succession in the family of good animals, and with no unbefitting mixture of blood. It is too often the case that when a young bull has been used too or three years in the same stock, he is got rid of—perhaps slaughtered, however good for stock he promises to be. This, I think, is injudicious, for two reasons—first, that the stock can hardly be sufficiently proved at so early an age; and secondly, that if the bull turns out a first-rate stock getter, he will be eagerly enough sought after, as that distinction belongs but to few. Many a good bull is often thrown away from too hasty a decision, and on the other hand there are far too many bulls reared from cows of very inferior pretensions. Cows, too, are often put out of stock in too inconsiderate a manner when they have slipped calves; sometimes an entire herd suffers from that inscrutable malady; but when that happens, it would be well to select a few of the best to take their chance another season. If the stock has been raised with great care and expense, and it is really good, the trial is undoubtedly worth making; but what, no doubt, also influences the decision to reject such an alternative, is the apprehension that some latent principle of the disease may be laid up in the reserved stock. Another ground on which objections are raised is the expense of keeping the cows round (as it is called) doing nothing—as if it were so easy a matter to replace good breeders—and it is scarcely ever allowed to be a subject of consideration how hard cows in a dry state may be kept; besides, it may be of some account that by an interval of rest, such as the occasion produces, the cow may collect a little more flesh than ordinary; and to persons visiting a herd of any one noted for his breed, a few animals seen under favourable appearances, having acquired their condition without forcing, may tend to enhance in the eyes of such persons the general character of the stock. If the malady I have been alluding to is only partial in the herd, it may have happened through some purely accidental cause, and is less likely to occur again.

Some remarks were made at the dinner of the Hereford Agricultural Society on the mischievous tendency of exhibiting for prizes fat breeding animals; in which I fully concur, and think it would be more for the advantage of the breed of the county if a larger number were exhibited, and kept on vegetable food only, by which we should be better able to judge of the general quality of the breeder's stock than where one animal only is selected—and that highly forced; and I am inclined to think the exhibition would thereby become more interesting and attractive.

Nov. 18, 1847. E. F. Welles.

—Hereford Journal.

FAMILIAR LETTERS ON AGRICULTURAL SUBJECTS.

NO. II.

ON THE DISCOVERY OF AN EXTRAORDINARY AMOUNT OF PHOSPHORIC ACID IN THE MARL OF THE UPPER GREEN SAND FORMATION.

Sir,—It is acknowledged on all hands that the rational improvement of agriculture is of the utmost importance to the welfare of this kingdom. Enlightened men are on every side turning their attention to this subject, and the probability is that but a short time will elapse before many practical impediments to the improvement of British husbandry will be removed by the imperial legislature.

Those who know the difficulty generally experienced of getting the great bulk of agriculturists to believe in the advantages to be derived from the dissemination of scientific truth, will agree with me that any fact, which clearly shows the necessity of chemical information to the farmer, will possess, in addition to its own practical value, a high importance, if it shall in any measure increase the desire for a more extended, practical, and scientific education.

Almost all branches of our great manufacturing interests have already received from chemistry the greatest assistance in their development and progress; but agriculture, through the prejudice of its operatives, has yet to learn that its chief support must be derived from a more thorough and scientific knowledge of the properties of those elementary bodies which compose our soils, our crops, and our manures. It may be argued that until recently chemistry was not in a condition to render much assistance to practical agriculture, and that consequently the farmer was not to be blamed for putting little faith in that which might probably only ultimately mislead him. It must be admitted that there is enough of truth in this remark to excuse, in some measure, the neglect of chemistry by our wise old forefathers; but not enough, in the slightest degree, to excuse those of their successors who, in these days of increased knowledge, do not avail themselves of the advantages which the improved state of chemical science can now more easily afford.

Some twelve months since, when at Farnham, I inspected the highly cultivated and fertile farm of J. M. Paine, Esq., who kindly conducted me over his estate, and pointed out the many varieties of soils and marls with which that part of the country abounds. One in particular, a "green marl," was mentioned by Mr. Paine as being of a singular character. Wherever it came to the surface, the hops and the wheat grew almost without manure, and wherever the other lands were marled with it their fertility was remarkably increased. Being highly interested in this marl, and suspecting, with Mr. Paine, the presence either of a considerable amount of bone earth, or of the alkalies (potash and soda), I requested that gentleman to favour me with a sample, which he subsequently sent to my laboratory.

A cursory examination, about nine months back, led me to infer the existence of an unusual amount of phosphoric acid in this marl; but other engagements pressing, I did not then pursue the investigation further. About two months since, however, I again took up the subject, and a series of most careful and rigid experiments have demonstrated the existence of phosphoric acid equivalent to from 4 to 5 per cent. of bone earth—an extraordinary amount, and I believe almost unparalleled in the natural or chemical history of soils.*

The determination of phosphoric acid in soils is both tedious and attended with considerable difficulty; and this, combined with the unusual character of the discovery, caused two other analytical chemists who had samples of the marl to aver that I had committed a mistake, and that the phosphates existed in the marl in an almost inappreciable degree. One of these gentlemen has, however, subsequently discovered his own error, and has confirmed my results; and the other will undoubtedly do the same, whenever he thinks fit to make his analysis in an accurate and rigid manner. The results of three different experiments gives 4.75 as the average per cent. of bone earth in this marl; but the probability is that the ordinary amount is nearer 5 per cent., or 1 cwt. to the ton. Bones contain about 50 per cent. of bone earth, so that 10 tons of the dried marl would, in that fertilizing effect which is due to the phosphates, be equal to 1 ton of bones. The marl likewise contains a certain amount of alkalies, which cannot fail to be of much benefit to plants.

To the neighbourhood of Farnham this discovery

* Dr. Playfair, in a careful examination of the soil and subsoil of a very productive field, near Sutton, Norfolk, found only a mere trace of phosphoric acid in the subsoil, and in the surface soil a little more than 0.3 per cent., this last being evidently derived from manure. Professor Johnston, of Edinburgh, seldom finds in the soils he analyzes more than a trace of phosphates.

promises to be of the highest importance; and, when a further investigation shall have revealed the properties and composition of other and neighbouring marls, it is probable that a lucrative manufactory may be then established, for the separation of the bone earth by chemical means, and its employment as an artificial manure.

The geological position of this marl is in the upper green sand formation, which lies immediately below the chalk. This formation is one of great interest, and is found largely developed in various parts of the country, the chalk in general resting upon it. Thus it is found underlying the great chain of chalk hills which, commencing at Folkestone, and passing by Ashford, Maidstone, Reigate, Guildford, Farnham, Alton, Petersfield, Steyning, and Lewes, terminates in the sea at Beachy Head. It is particularly developed about Alton and Petersfield, where the fertility of the "malm rock" is very well known. It is also found at Shaftesbury, Devizes, Swindon, and many other parts of the country. If, therefore, an accurate analysis of the marl of this formation in these other localities should prove a similar and equal presence of phosphoric acid, this discovery may be looked upon as one of the many important benefits that British agriculture has already received from the aid of chemical science.

It cannot be doubted that the improving landlords of this country would find it much to their advantage to have proper analyses of the subsoils and marls of their estates; for I am persuaded that the amount of mineral riches which lie in the earth, buried, useless, and unknown, is far beyond any ordinary computation.

These investigations will be proceeded with at my earliest convenience, and the results, together with a more detailed account by Mr. Paine, of the geological position of the marls, will then be made public.

I am, Sir, yours truly,

J. C. Nesbit.

Agricultural and Scientific School, Kennington, London, January 3, 1848.

EXPERIMENTS WITH MANURES.

BY HERMSTAID AND SCHUBLER.

A soil capable of producing without any manure three times the seed, gave when the following substances were applied in equal quantities:—

Dried leaves and other vegetable matter	5	times the seed.
Stable manure	7	"
Pigeon dung	9	"
Horse dung	10	"
Human urine	12	"
Human excrements	14	"

Girardin.

Such experiments as the above are far more conclusive and satisfactory answers to inquiries respecting the comparative value of various manures than the theories of scientific men, at least in the present state of our knowledge. Considerable attention having recently been directed to the change and waste which takes place in farm-yard manure under the common management, I enclose you an analysis by Richardson. One very curious and important point disclosed is, that it *actually contained no ammonia*, though it contained some azotized matter capable of yielding that substance by further decomposition; it was part of a large heap, which had been carted home from a stable of highly fed horses, about three months before, and was forwarded for examination in the state usually applied to the soil.

The manure was composed of—

Water	64·96
Humus	8·29
Insoluble organic matter	16·42
Inorganic ditto	10·33
	100·00

The composition of the inorganic matter in 100 parts is as follows:—

A.—Portion soluble in water—

Potash	3·22
Soda	2·73
Lime	·34
Magnesia	·26
Sulphuric acid	3·27
Chlorine	3·15
Silicic acid	·04
	—13·01

B.—Residue soluble in acids—

Silica	27·01
Phosphate of lime	7·11
Phosphate of magnesia	2·26
Phosphate of iron	4·68
Phosphate of manganese	trace
Phosphate of alumina	trace
Carbonate of lime	9.34
Carbonate of magnesia	1·63
Sand	30·99
Charcoal	·83
Alkali in basic, silicate and loss	3.14
	—86·99
	100·00

C.—Analysis of organic part of manure—

Carbon	37·40
Hydrogen	5·27
Oxygen	25·52
Azote	1.76
Ashes	30·05
	100·00

The above is, unquestionably, one of the most complete analysis of manure yet published. In comparing it with those published by Boussingault, as the mean of six analyses on his own farm in France:—

Carbon	35·8
Hydrogen	4·2
Oxygen	25·8
Azote	2·0
Salts	32·2
	100·00

The conclusion seems almost forced upon us, that even in manures there are some definite chemical compounds: the agreement between the two statements is both remarkable and satisfactory. C. E. D.

COPYHOLDS.

COPY OF THE SIXTH REPORT OF THE COPYHOLD COMMISSIONERS TO HER MAJESTY'S PRINCIPAL SECRETARY OF STATE FOR THE HOME DEPARTMENT—PURSUANT TO THE ACT 4 AND 5 VICT., C. 35, S. 3.

PRESENTED TO BOTH HOUSES OF PARLIAMENT BY COMMAND OF HER MAJESTY.

Copyhold Commission, 24th November, 1847.

SIR,—We have the honour of presenting to you our Sixth Report.

It will be seen, by a reference to the Report of the Select Committee of the House of Commons on Copyhold Enfranchisement, printed in August, 1838, that the plan of mere voluntary enfranchisement was recommended for a time, and that a more coercive measure was pointed out as alone calculated to meet the wishes and wants of the country.

After more than six years' experience, we have to report that there is a slow and gradual advance in the voluntary enfranchisement of copyholds under ecclesiastical lords.

It seems probable that almost the whole of such copyholds will in time disappear.

It is different, as far as this Commission is concerned with copyholds held under lay lords.

The causes of this fact are to be found partly in the less controlled influence of the stewards—an influence very generally opposed to enfranchisement—and partly in the expectation of both lords and tenants, that some further steps will be taken by the Legislature to enforce commutation or enfranchisement.

There is a general indisposition to move till it is known what those steps will be; and if the hopes expressed by the Committee of 1838 are to be fulfilled at all, the time seems come when some more efficient measures should be adopted to accelerate the extinction, if not of the copyhold tenure, yet at least of those social and economical evils which are the most distinctly identified with it.

Such measures, if any are taken, will probably establish either—

1st. A general and complete system of compulsory enfranchisement; or,

2ndly. A more limited and gradual system of commutation, by which what is uncertain and mischievous in the copyhold incidents and tenure may be got rid of, leaving the tenure, so mended, as it is.

We do not dwell on the scheme of a complete and compulsory enfranchisement of all the copyhold estates in the kingdom.

We have great doubts if it would be found practicable to pass such a measure.

We have no doubt at all that, if it passed, the difficulties and expense of its application to the whole kingdom, and some serious local difficulties of detail, would be found insuperable obstacles to the completion of this scheme.

With this conviction, we are disposed to recommend, as a more practicable measure, and for all economical purposes an equally efficient one, a limited system of compulsory commutation.

We will begin, however, by mentioning a measure even more limited than that we mean ultimately to propose.

Heriots form one of those vexatious incidents to copyhold tenure which create a very general feeling of irritation, much greater than their average pressure warrants.

The most valuable picture may be seized as a chattel heriot in respect of a copyhold tenement not worth £10.

In the case of live heriots, race-horses and other valuable animals may be seized under like circumstances.

Instances of the full exercise of such rights, though rare, are not unknown.

To commute these heriots into certain fixed payments, giving the lord full compensation would be an easy and popular operation.

It would only be necessary to enact that, on application by any tenant, the Copyhold Commissioners should, by such means as to them seemed fit, ascertain the value of the lord's right to a live or chattel heriot, and then establish a small fixed payment in its place, assigning to the lord such a sum of money as his abandoned right was worth. So much might be easily done, and it is not probable that a Bill to effect this object alone would meet with any opposition.

But this step would only remove a vexation—the substantial economical evils of the copyhold tenure would remain untouched. These consist in *uncertain fines*, which drive capital from improvements on the land, and in rights to timber, and to a control over buildings, which rights are found pernicious.

To get entirely rid of these evils, it would be necessary to change the uncertain fine into a fixed fine, to set a value on the right to timber, and to give the lord, either in money or in a first charge on the estate, a full equivalent for the abandonment of these rights. The tenure might remain untouched, and would then become, we are prepared to show, not only as desirable, but more desirable than the common freehold; always supposing, however, that the steward's fees were fairly but distinctly regulated—a point to which we shall again recur.

Supposing this principle of commuting uncertain incidents adopted, there are at least two very different modes by which it may be carried out:

> Each individual tenant may be empowered to call on the Commission to commute his uncertain payments, and to assign the lord a consideration.

This plan, which has many recommendations, will be met by one very serious objection.

The lords will complain that, when their solvent and

respectable tenants have commuted, they will be left with a bad remnant, constituting a much less desirable tenantry on their manors.

There would be truth in this objection, and it should be met and removed.

To effect this, we would propose that whenever two-thirds in value of the copyholds in any manor were commuted, the lords should be entitled to call on the Commission for a compulsory commutation of the remainder, which would not, with the experience then acquired, be a difficult operation.

So modified, the compulsory commutation of the uncertain incidents might be carried through, we think, smoothly, and, for all economical purposes, effectually.

The real objections to the tenure would be removed precisely when their pressure was felt, and persons wishing to plant, build, drain, or subsoil plough, might, on securing to the lord a fair compensation, go to work as safely and freely as if their tenure was freehold. There would be no rough and general interference, and the change might proceed silently and almost imperceptibly.

It may be objected that this process would be gradual, and occupy much time; and if this objection is thought serious, then a second and different plan for carrying out the same principle might be adopted:

> The Commission might be empowered and enjoined to take the manors of England *seriatim*, and completely commute all the uncertain incidents in each by turn.

This would be a more rapid operation, no doubt; but then it would be rougher and less practically and immediately useful.

Taking all the manors only in their turn, estates on which the pressure of the copyhold incidents was felt as a present obstacle to improvements might come late in the rotation, while other estates where the pressure is not at present felt might be interfered with prematurely.

On the whole, then, we give a decided preference to the plan of allowing the individual tenants to demand a commutation when they wish, securing to the lords, after two-thirds of a manor have been so commuted, a compulsory commutation of the remaining third.

This plan might be carried out without any serious expense to the public. If the parties agreed on the annual value, a short calculation at the office would complete the task of the Commissioners.

If the parties could not agree on the annual value, it must be ascertained by some agent of the Commission; and the expense of such an estimate might properly be levied, partly on the tenant, partly on the consideration to the lord.

Such an arrangement, besides being just, would be an efficient inducement to lords and tenants to agree voluntarily as to the annual value of the lands to be dealt with.

It may be an objection to this plan, not only that its progress would be slow compared with that of more decisive measures, but would also involve the existence for an indefinite period of some Central Commission.

It will be recollected, however, that all the expenses, except those of the Central Commission, will be annually small, exactly in proportion to the slowness with which the country itself carries the measure out.

Care has already been taken that the present Copyhold Commission should expire with the Tithe Commission; and when they come to an end, it will be for the Government to consider and determine how, and by what body, the business of superintending the progress of copyhold commutation may thereafter be most economically and efficiently conducted.

There remain one or two points to be noticed:—

The first and most important is, *the fees of stewards*. Were it not for the multiplication of tenements, those fees would not form a peculiarly burthensome charge on the transfer of property.

The system of multiplying tenements, charging for each whole and distinct sets of fees, seems to us an abuse which requires some correction. There does not exist at present any short and efficient mode of resisting unreasonable charges.

Any Bill on the subject might contain a provision, that, within months after passing the Bill, the Copyhold Commissioners, with the assistance of one of the Taxing Masters of the Court of Chancery, should publish a general list of fees, which, if it is thought fit, might be submitted to Parliament, or to the Chancellor, or to the Courts at Westminster.

This list once promulgated, a right should be given to the tenants to do what they cannot now do; that is, to submit any charge for fees which they deem excessive to the taxing officers of some of the Law Courts.

All uncertain incidents commuted, and the fees thus regulated, a copyhold tenure would be not only as good, but even better than a freehold. It would be subject to no appreciable inconvenience from which the freehold is exempt, and would, besides, give a simple form of registration to which the people are already accustomed and reconciled.

In this plan, the lords' right to timber should be one of which the value should be estimated and charged for.

The right to minerals can hardly be valued. It is guarded with great jealousy by the lords, and should be left as it now is; that is, wholly uncommuted, or to be commuted only by voluntary agreements, for the making which all reasonable powers and facilities should be given to both lords and tenants. It is clear that no third parties can satisfactorily put a value on what is hidden in the bosom of the earth.

There will, probably, be some cases in which the compulsory powers of the Commissioners should be modified or restrained.

One whole class, at least, of such cases must be attended to.

When the future improvement of copyhold lands depends on the outlay of the tenant, public policy, we think, demands that his hands should be set entirely free.

But there are cases where a highly improved value will probably be attained without any exertion or outlay on the part of the tenants; such is the case with all grounds likely to acquire value, as building or accommodation lands.

The lords of manors will complain that a compulsory commutation made at once will deprive them of their share of this prospective value.

We think it right to state this, and to say that we see no means of softening the opposition made on this ground, if any should arise, except by giving the Commission—first, extensive powers of calculating prospective value; and, secondly, further power, in very strong cases, of refusing to interfere altogether, and leaving the parties to their voluntary arrangements.

We have the honour, &c.,

WM. BLAMIRE,
T. WENTWORTH BULLER,
RD. JONES.

The Right Hon. Sir G. Grey, Bart., M.P.,
&c., &c., &c.

THE GIANT SAINFOIN.

LETTER I.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—Having, in consequence of the notice of this plant in your useful miscellany, lately received various communications from the counties of Cambridge, Gloucester, and Northampton, and to which I have partially replied, promising at the same time to forward a more general reply, through the same medium; I trouble you with this to redeem my pledge, believing that the subject upon which it treats will be acceptable to many others of your readers.

The giant sainfoin, as it has been styled by Mr. Hart, of Ashwell, who introduced it, was, as far as I can learn, unknown in this kingdom (certainly in this neighbourhood) until about sixteen years ago. It was then, on Mr. Hart's inquiring in the market for sainfoin seed, that he was informed, by the late Mr. Carrington, of Shefford, Beds, that he had a quantity of old foreign seed, which he was at liberty to try; and in case it did not grow, he would charge nothing for it. These terms being accepted, the seed was sown; and although only a very partial crop was obtained, it turned out to be a distinct species of the plant; which, in my humble opinion, will ultimately supersede the growth of the common stock, unless it be upon some of the very poorest of our soils, where it is sometimes sown for purposes for which the giant species would be unsuitable, as I may perhaps show in some future communication.

My intelligent correspondent from Gloucestershire has propounded certain inquiries, the answers to which I shall proceed to give, taking the liberty to transpose the order in which they are put; hoping they will be satisfactory to others as well as to himself.

Query 1st: How is this stock superior to the common sort?

Answer: It is somewhat more rapid in its growth in the spring, but still more so after the first cutting, which in this locality would take place about the end of May, or the beginning of June. It will then grow again somewhat rapidly, and in July will again be in full flowers when it may be cut for hay; or if suffered to stand until August, it may be cut for seed. If cut for hay, a third crop will be ready in September for soiling; and I have known it, after the second crop has been cut for seed, to produce an eddish in October nearly equal to any I have seen produced from the common stock after the first cutting. Again: the root is not so large as that produced by the common stock, roots of which I have known to penetrate, upon a chalky soil, to the depth of four or five feet; but the roots of the giant species are much smaller. The stalk, also, will be larger and taller, but will possess a greater cavity in the middle, and will flatten more in the hay stack than the common stock does; but whether this is advantageous or not I really cannot say.

Query 2nd: Will it soil well without bleeding the plant?

Answer: It will.

Query 3rd: What will be the probable amount of crop the first year upon a good sandy loam?

Answer: I have known fifty cwt. per acre mown the first year, by the first week in June, both upon good gravel and chalk loam; and I see no reason why it should not produce as much upon a good sandy loam; but this will of course depend upon the season, and upon the strength which the plant has attained at the time; for, although this variety matures itself much sooner than the common stock, still I have never yet known a crop of the giant species but what was better in the second than the first year, provided the season was equally favourable.

Query 4th: Could it be broken up for wheat, after one crop, with advantage?

Answer: Upon this question I feel considerable delicacy, in consequence of an opinion expressed by your reporter for Beds, who has cultivated this species upon a small scale for some years, and who never ventures an opinion upon practical measures without due consideration. In one of his reports, he states that he believes, when the seed can be obtained at an easy rate, this practice will be adopted. I am, however, of a different opinion; not because I think the practice would not answer (with seed, at a cheap rate)—on the contrary, I believe it would—but because I think it will not be the most profitable mode of cultivating this valuable plant, seeing that the plant once set, the crops for the next two years at least would, without the cost of planting, and without exhausting the land, be far more valuable than any crops you could substitute for them. There are,

however, other reasons of a practical nature, which at some future period I will, with your permission, submit to your readers—reasons, moreover, based upon my own experience, which I flatter myself will demonstrate the value of this newly-discovered species in such a way as shall make it appear desirable to attend to the cultivation thereof upon vast tracts of land, not excepting our wheat soils, where the cultivation of this plant has been hitherto unknown.

I must now conclude by stating that should any of your readers, whether ranking among the sceptical or the curious, wish for a visible demonstration of the properties of the species, I shall be most happy to see them; having no doubt that when I shall have shown the plant, the hay (the produce of the first crop), and the stalk with the seed upon it (the produce of the second crop), they will, with myself, be perfectly satisfied that the discovery of the species will ultimately prove an invaluable boon to the cultivators of the plant.

I am, sir, your obedient servant,

THOS. HINE.

Newnham, Baldock, Herts, Dec. 3rd.

LETTER II.

SIR,—Pursuant to the intention avowed in my letter of the 3rd ult., I beg leave, with your permission, to submit to your readers some further particulars relative to the cultivation of this plant; and my Gloucestershire correspondent will perceive that my observations will in their details furnish an answer to his remaining enquiry, viz.,—"What quantity of seed is required per acre?"

This will mainly depend upon the method in which it is cultivated. I should recommend parties desirous of cultivating this species of the plant to adopt the same course as they have known to be successful in their various localities, in reference to the common stock, the properties and requirements of the one being, in my opinion (with one exception, to which I may hereafter advert), precisely similar to those of the other. Still, however, when it is evident that a more successful method is adopted in another locality, I hold it to be the duty of enterprising characters to try it in their own, taking care at the same time to do so with caution.

For my own part, I have been a cultivator of sainfoin for more than 30 years, and until about 10 years ago I invariably adopted the practice generally had recourse to in this neighbourhood, of planting it with a crop of barley or oats sown after turnips, where the land had been previously well cleaned and cultivated as a preparation for the crop, and sowing not more than one-half or at most two-thirds of the quantity of corn lest it should grow too large a crop and endanger the plant of sainfoin, which would of course prove a greater loss than a partial defection in the barley crop, seeing it would extend itself over the whole number of years the crop remained in plant. But even with this precaution I have known in seasons of excessive drought that the plant has been so far destroyed as to render it unfit for the purpose for which it was sown. To obviate this and to procure a crop of sainfoin without any loss in the preceding crop is what I have been aiming at for the last 10 years; with what success I shall proceed to detail.

By experience I have proved that the land, to ensure success in planting the crop, should possess friability upon the surface and solidity in the substratum immediately below the surface. Without a friable surface to retain the moisture immediately upon that surface you cannot secure a plant, and without solidity in the soil directly under the plants to receive the first roots in a season of excessive drought, although you may have secured a plant, you cannot retain it; but with both these pre-requisites I have never yet seen a failure. The question then naturally presents itself, Where is this preparation found in the ordinary course of cultivation upon a farm? Upon land sown in a perfectly clean state with wheat in the preceding autumn, you will in the spring find all that you may require to ensure success. It was conviction upon this point that led me to adopt the practice (which complete success has induced me to continue) of drilling the seed between the rows of wheat as early as possible in the spring, waiting however in case there should be many annual weeds present themselves until I have given the land one hoeing. I may here observe, that with a view to this, I take care and prepare a piece of land in the autumn (say a pea stubble for instance), by giving it a ploughing as soon as the crop is off, and by use of the scarifier and harrows working it completely fine; this, if it be clean, I do not plough again, and keep the weeds and what else may shoot down by other means until the wheat is drilled, between the rows of which the seed is deposited as above. I have seen excellent crops produced in this way with less seed by a bushel per acre than it would have been prudent to have sown with a spring crop; from 2½ to 3 bushels being amply sufficient, put in in this way. I have now crops growing produced by 2, 2½, and 3 bushels respectively; but, although they are all good, I give the preference to the thickest sown; the hay is not so coarse in the stalk, and there are more stems to produce seed on the second mowing. Nor is this all; it is clear to me that the plant will mature itself sooner in this way than with a spring crop, unless the season should prove more than ordinarily favourable for a crop sown with spring corn. There will also be no loss in the preceding crop. I have seen excellent plants of sainfoin where the land has produced 4½ and 5 quarters of wheat the preceding year. I am aware that the introducer of the giant species recommends that it should be sown in the spring without a crop, and I have known such a practice answer well. He has now an excellent plant put in last spring in this way. I think also a less quantity of seed may be safely used by this practice, especially if the land is pretty free from annual weeds. I have also known very good crops produced when sown with barley and oats, but I am clearly of opinion that more seed should be sown than would be required either in one or the other of the above methods. I have been thus particular in detailing the result of my experience as to the cultivation of sainfoin in a wheat crop, not with a view to condemn a different practice of any sort, where such a practice has for any length of time successfully obtained; but

principally for the purpose of submitting to your readers what in this locality I have proved to be a more excellent way; a way moreover which, without losing sight of the capabilities of this variety of the plant (which I shall explain in my next), and, paying due regard to the four course system of cultivation (which I shall never wish to supplant), will, in my humble opinion, so commend itself to the intelligent cultivators of the soil by the ample remuneration it must of necessity produce, as to bring it into general use upon all soils adapted to the cultivation thereof. I am, Sir, your obedient servant,

THOMAS HINE.

Newnham, near Baldock, Hertfordshire.

LETTER III.

SIR,—Having, in my letter of the 17th ult., stated at large my reasons for giving a preference to a wheat crop, in planting a crop of sainfoin I proceed to state the precise manner in which the cultivation of the giant species should, in my opinion, be practised upon land under the four-course system, so as to produce—without any derangement of such system—a far greater remuneration to the cultivator than can possibly be derived from any crops he can substitute for them. In doing this I would observe, that the system I recommend I have reduced into practice; the working of which I shall feel much pleasure in submitting to the inspection of any gentleman who will honour me with a visit.

I take it for granted that the system of sowing the whole of the barley season with clover is no longer practised generally. It appears to me that half the shift sown every eight years, will produce at least three-fourths of the food which, upon an average, can be obtained from the entire shift sown every fourth year. Upon a part of this shift—say one-sixth—which I will suppose in cropping with peas or beans (and which, upon a farm with one hundred acres, in a season will be seventeen acres), I propose to steal a march in the harvest-month, as detailed in my last, and by a little extra work applied then, to render the process of tillage after the ensuing wheat crop totally unnecessary. I would then in the wheat crop, whether sown broad-cast or otherwise, deposit the seed in the spring, with a drill; and in that case, the land will present you with a crop of sainfoin the ensuing year, in the place of the turnip crop. This may be mown early in June for hay, again in August for seed, and will produce a fine eddish in October. This I should continue in plant the next year, when it will displace the barley crop; and again in the third year, displacing the clover layer. I then propose it should be taken up for wheat, with the rest of the season, when I really think that, with the same treatment, it will produce the best crop which the season will afford.

I am quite aware that the plant of sainfoin will not be exhausted, and that possibly another crop, of greater value than the wheat crop, might be produced; but this, if adopted from any special cause, must be the exception and not the rule, for the undermentioned reason: Upon a sainfoin layer of four or five years' standing I have frequently known sad ravages to be made by the wire-worm in the wheat crop, and also in the turnips and barley that have followed. But when the plant has been taken up in full vigour—say at the end of three years—I have never known these disasters occur.

Your practical readers will perceive that by planting another seventeen acres in a similar way the ensuing year, and another in the third, a breadth of fifty acres may be appropriated in each year to the growth of this valuable plant, without any sacrifice of corn-growing crops, save the seventeen acres of barley in each year. From fifty acres of sainfoin thus obtained, I calculate that at least one hundred tons of hay will be produced by the first mowing, which will, for the most part, be sufficient for the entire consumption upon the farm, especially when it is borne in mind that the fodder from the seed crop will produce upon the fifty acres (upon an average) food equal in quantity and value to forty tons of meadow hay. By adopting this system, it follows that the whole of the clovers may be fed with sheep, except in such localities where a more profitable mode of disposing thereof can be had recourse to. This practice, moreover, will meet one of the peculiar properties of this variety, which is this: I do not think it will remain in plant so long as the common stock, which, however, when the circumstances of its maturing itself so much earlier, in connexion with the repeated mowings it undergoes, is not at all to be wondered at. Still, I have known it answer well for five years. Mr. Gibbins, of Stotfold, Beds, took up a piece last Michaelmas, which had produced five crops of hay, and four of seed. The soil was a gravel loam, and produced last year, as well as in every subsequent year, at least fifty cwt. of hay per acre; but the seed of last year was a total failure.

It may possibly occur to your readers that I am advocating the cultivation of this plant upon dry soils alone; this, however, is not the case. I have witnessed upon rich clay loams crops of sainfoin equal to any the country can produce, and even upon weaker land of this description, provided the drainage be complete. I have no doubt the system I recommend may be successfully adopted; in which case I should recommend that a piece of land should be selected, free from couch-grass, and as much as possible from grass of every description, which is decidedly the most formidable enemy the sainfoin has to encounter. This should be planted with beans, and kept perfectly clean by repeated hoeings; and whether drilled or sown broadcast with wheat, the seed may be put in by drilling in the spring, which will not injure the wheat, and will effectually cover the seed; which, by reason of its being encased in a husk, is light and difficult to cover, unless some such mode is adopted.

I have now divulged my plan, based upon experience, which, in my letter of the 3rd of December, I ventured to predict would be a more profitable mode of cultivating this species than the one suggested by your reporter for Beds, of sowing it for one year in the place of clover; and I now beg leave to request the candid opinion of your intelligent readers whether or not I have established my position. Here, however, I may observe, that your reporter's suggestion was based upon an hypothesis which he will never live to see realized, that of obtaining

the seed of the giant species at the price of the common stock. I have no hesitation in stating that the notoriety which this species has obtained is increasing the demand for the seed in a way which its generating powers can never possibly supply; it is, in point of fact, more slow in propagating its species than any plant I ever cultivated.

Perhaps I cannot do better than illustrate this by a comparative fact. A new species of wheat is introduced; I procure two bushels, and plant one acre. With the produce of this (say 4 quarters) I the next season plant 16 acres; which, at the expiration of the second year (after the same rate), will produce sufficient to plant 256 acres. And now let us look at what the giant sainfoin will effect in the same time. I plant an acre with 3 bushels of seed; but I get no return at all until the second harvest; when, perhaps, 18 bushels will be obtained, or sufficient to plant 6 acres: so that up to this period the propagating powers of the seed, as compared with those of the wheat, are only in the proportion of 6 to 256; and the longer the parallel is continued the greater the disparagement will be.

But, independent of all this, let us look at the system I recommend, with due regard to its own merits, which I flatter myself will make its superiority more clearly apparent. I appeal to the intelligent flock-master, whether the system is not calculated to procure a more abundant supply of food, at a less expense and sacrifice, than can be obtained in any other way. It is quite clear to me that it will provide for a much larger quantity of sheep, both in winter and summer, than can be obtained without it. And, besides this, some thirty or forty additional beast, purchased in a forward state, may be prepared for Smithfield, with the assistance of cake and meal, the use of which in preparing manure is self-evident. And last, though not least, in this way ample provision both for hay and summer feed may be made, without introducing clover oftener than once in eight years, which will entitle us to expect a full plant of clover; and, what is still more important, a full plant of wheat after it. Whereas, with a partial crop of clover, the wheat is sure to be more or less defective.

I had fully intended with this letter to have closed my remarks, but with your permission I shall trouble you with another; which, however, shall be chiefly of a statistical character, in order more fully to demonstrate the superiority of the system I advocate, which when your reporter has read and candidly considered, I shall feel obliged by the exercise of his discriminating judgment and able pen, in correcting any error into which I may have inadvertently fallen, and which his cultivation of the species for several years will so eminently qualify him to detect.

I am, sir, yours, &c.

THOMAS HINE.

NOTES OF AN AGRICULTURAL TOUR THROUGH NOTTINGHAMSHIRE.

BY M. M. M.

PART III.

(*Concluded from page* 9.)

There are few farms in any district of the kingdom which do not present some plague-spot to exercise the skill and ingenuity of the cultivator, and, after all, perhaps to baffle his best endeavours. Sometimes an untractable rock breaks out near the surface; sometimes an impervious subsoil defeats his plans; or some peat too loose to sustain the roots of plants—some situation too low to admit of drainage, or possibly some portion of the farm too redundant in something inimical to vegetation, or destitute of something which his cultivated plants require. To overcome these the ordinary appliances of the farmer are inadequate; his manure, his lime, his guano will not remedy the evil, and his land requires a doctor as completely as does any diseased patient.

The same observation applies to a tract of country of a more extended scale; and agricultural difficulties have to be grappled with and overcome in one district which are unknown in another. In Lincolnshire the fens have to be drained into the rivers rolling above their level; in Buckinghamshire, soils have to be freed from water, which held it like a basin; in Hertfordshire the snow-like sheep-walks of chalk have to be tormented until they produce corn and turnips, beef and mutton. The moorlands of Yorkshire have to be freed from their moss and heather, and made to produce the food of man; and thus few counties in England do not possess some one or other of these agricultural "lions."

But the wants of the age require something more than the mere overcoming of these practical difficulties. To be successful, every available source of amelioration and improvement within the range of possibility must have labour, and skill, and capital applied to it, to bring its powers into operation in improving the soil. In some light sandy waste perhaps lies hidden some bed of clay or marl, which will give consistency and calibre to the soil, and enable it to grow the finest wheat; or near some sterile and tenacious clay a friendly limestone-bed may be discovered to ameliorate its character; and, at any rate, fire may be applied to it, either to

break down its tenacity or manufacture it into tiles. Some river, rich in its sewage, may flow through some poverty-stricken meadow fitted to renovate its capabilities; or some low and worn-out tract may lie in the vicinity of some tidal river, in whose flowing waters are suspended perhaps the means of forming the richest soil over ten thousand acres, capable almost of growing produce during the life of its applicant, requiring its fertilizing influence to be called into operation to fill the barns of the occupier with plenty, and the pocket of the land owner with wealth. It is possible, therefore, so completely to alter the character of the soil as to make the most barren and unfruitful produce the greatest abundance; and to nothing that we are aware of do these remarks apply with greater force than to the practice of warping.

Although warping is not practised in Nottinghamshire, owing to the weakness of the tides and the elevation of the surface higher up the river Trent than Gainsborough, which renders it extremely problematical whether it could be effected except perhaps in the district immediately between West Stockwith and Gainsborough, still as there is an isolated instance of 100 acres of warping which has not been noticed that we are aware of, and as it lies not 200 yards over the border of the county, we shall be excused for alluding to it, possibly because the same system would apply to a small portion of this county, including perhaps the parish of Beckingham, and others in that quarter.

The farm is occupied by Mr. Mimmack, and is immediately over the Haxey toll-gate, situate on the river Idle, which separates Nottinghamshire from the county of Lincoln. 100 acres are enclosed by banks cut out of the natural sand, and raised some six feet high, sufficiently broad to admit of a carriage passing over them. The water is brought up from the river by a sewer, and at certain tides is allowed to spread over the whole. It is owing possibly to the double action of the natural force of the descending river meeting the tide, aided by the traffic continually going on upon the Trent, that there is a great quantity of silt or fine mud suspended in the waters. By allowing the waters to spread over a surface of ground, a considerable amount of this is deposited. The warping in question has been four years in operation, and varying quantities of from one to two and three feet have been deposited, and it is now about completed. It is somewhat singular that the greater the amount of fall secured from the river the more silt is carried down, and the greater deposit takes place. Perhaps some erroneous management of this piece has taken place; the flood has been let in at the lowest part instead of the highest, which has prevented the deposits being made sufficiently thick at the higher portions. As the deposits vary, conductors for the water are cut through to shallow deposits, in order to render the whole as uniform as possible. This accounts for the long time which the warping has occupied.

The amount paid for warping is £20 per acre, and it is intended to be a permanent work. The banks are now in course of being thrown down and levelled with warp, and the land sown. The richest crops follow this operation; everything calculated to supply vegetation with its elementary parts is supplied. The particles of sand and clay brought in the most minute division, the saline properties of the sea-water, the suspended animal and vegetable matter acquired by the Trent from the towns which it passes, and then the various mineral matters it holds in solution or suspension in its meanderings, and those of its tributaries, over thousands of acres of different geological strata, render it all that can be desired. A peculiar mode of cropping, however, is necessary. Oats are generally first sown, which are the only grain which will grow for several years. Seeds follow the oats, which are very luxuriant even while the warping is going on. A place not covered by the water grows the richest grasses.

Owing to unfortunate accidents—the breaking of banks, and other disadvantages—and also owing to having their conducting drain to cut for this first operation, the cost has been between £5,000 or £6,000. The best time for deposits is about two days after a new moon: sixteen or eighteen tides are obtained every moon. Generally, after a thunderstorm the warp is favourable, but not so useful when there is much fresh water in the river, probably because it has more power in overcoming the tides.

There is another improvement of great extent and importance just commenced in another part of the county of Nottingham, which ought not to be passed over. The river Devon in its course from Newark to Butterfield has a very superficial channel, and much of its capacity and fall is lost by this circumstance. In its passage through the parishes of Stoke, Elston, Fleatham, and Flamborough, &c., 3,000 acres are liable to be flooded by its present imperfect condition.

Works have been commenced under the superintendence of commissioners, to deepen the river, and embank such parts of it as admit of being so improved, and also, where necessary, to widen the channel. The intended river is to be fifty-four feet broad at the commencement of the works. A six-feet bank is to be put up at the bottom of the fall. Several new bridges will be necessary, owing to the improvement. The extent of the contemplated works may be estimated from the fact, that the

contract is taken by Ridley, of Birmingham, for £8,093. Mr. John Tebbet, of Mansfield Woodhouse, is inspector of the works.

There are, perhaps, few counties where more attention is paid to fences; and whether the mode of keeping them be good or bad, there is no doubt but the result of careful protection, which is invariably given them, has a very conservative tendency.

The plan of "scotchifying," or cutting one-half of the fence upwards, and placing the brush either in faggots at a small distance before the fence to protect it, or making, as some persons do, artificial dead fencing to protect the recently cut one, is all but general in the county, and was introduced by Mr. Watson, of Walkeringham. When the half fence so cut is grown sufficiently, the remaining half is cut in the same manner, and similarly protected. The fence by this process is widest at the bottom, and runs to a point at the top; this form of fence having the advantage of allowing all the plants or shoots to spring perpendicularly upwards, and it is asserted that it has the tendency to make the fences keep sound and vigorous bottoms. They are also much improved in neatness by being kept clipped or cropped in summer—a practice which is said to economise labour, and having also the advantage of the thorns not having acquired sufficient woody fibre to render them injurious to the feet of sheep, which they are, if allowed to remain until late in the autumn. Mr. Parkinson, whose farms are perhaps a most perfect model, adopts these plans pretty extensively even where cattle are grazed; but the thick mother, or protective fence which is set up beside it, is a sufficient reason for its being neat and orderly, and a considerable expense is incurred. It is, however, but just to say, that the original mode of laying fences is liable to very great and permanent injury if they are within the reach of grazing sheep or cattle.

The mode of managing hay and clover is perhaps the very worst part of Nottinghamshire farming. It seems as if in this matter, at least, little progress has been made—probably because it is not a grass county; but the mode of getting clover is equally slovenly, wasteful, and objectionable. The hay is spread after the mowers, and turned when partly dry. Sometimes it is turned again, and perhaps twice, and then forked and raked up into small heaps, possibly as much as a man could carry: of course, if rain should come, the waste at the top and bottom is very great; but it is got together in such a state that it is not safe to put it in larger heaps. How safe, how ready, how much more it would tend to the flavour, nutrition, and value every way of the grass, if it were, when turned, put into lap-cock or foot-cock, folded round the arm, and placed upon the sward with a hole through it, to admit of the air, made by the removal of the haymaker's arm, which he withdraws from under it as he places it down. In this state it is next to being in the stack as it regards safety and security, its sweetness and aroma in almost any weather.

The plan of turning over the clover, and then raking it into similar heaps, is practised by the best farmers, and is even more objectionable. Not only does it break off the fine leaves and flowers, but exposes it unnecessarily to the sun and air, and in case of wet seasons absolutely spoils it. How much better to tie it up in ruckles, or roll it up in the form of a cone, and tied at the head with a portion of the clover drawn out of the ruckle, when it would stand and dry in fine weather, and resist almost any amount of rain in a wet season.

The remarks that you sometimes hear made, of the trouble and expense of the plan, are quite fallacious, and entirely unworthy the spirited Nottinghamshire farmer.

The county, indeed, is not of a grazing character, excepting the Trent-side, and near the other rivers there is little, very little, useful grass land; for, though it is asserted that the second year's grasses are better than the first, still they soon, on the sandstone land at least, deteriorate more and more year after year. By the river-sides the land is of a natural warp or an alluvial soil, and both feeding and grazing are carried on successfully. The short-horns are gradually making their way, and filling the county with valuable stock. There are breeders of short-horns of as much public spirit, judgment, and eminence as perhaps in any part of the kingdom, under equal circumstances; for though they have not been so long practised as the Yorkshire and Durham breeders, it must be admitted they are following very rapidly, if not absolutely overtaking them, in breeding. The herds of the late Earl Spencer, Mr. Watson, and Mr. Parkinson, may be considered, and truly are, a credit to the most judicious breeders; and it must be confessed there is less of the absurd rage for fattening breeding animals, which lamentably in some quarters appears to prevail.

That early-mature animals, and their disposition to lay on fat, are desirable, there can be no doubt. That some strains of blood possess the propensities more than others in many respects excellent, there is no question; but if these superior animals are crammed to make them monsters, it cannot be too strongly reprobated. The soiling system for both cattle and horses is very general, and as liberal a use of linseed-cake is made in the straw-folds in winter, as in their clover-leys in summer.

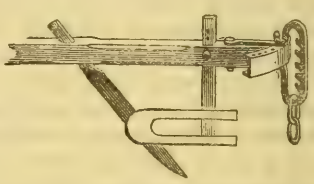
The horses are of the black or Leicestershire breed, and may perhaps be considered somewhat too heavy for the light soil; still they are not with-

out energy combined with the power. They are carefully attended to—chaff sometimes steamed with Swede turnips in winter, and tares and second crop of clover are given in summer. This housing makes them somewhat more liable to be annoyed by the teasing of flies when out; but nearly every farmer has a pair of cool linen ear-caps upon his working horses, which keep away minute flies, to which many horses dragging the whole of the day are relentlessly and irremediably subjected, and by which they are incessantly tormented.

The sheep are, on the turnip-growing districts, of a very improved character—the Leicesters, or new Leicesters, which carry abundance of both wool and mutton. And that they have the character of early maturity, is sufficiently manifest by the practice before spoken of—that of getting them fed off at a year old, while in many counties they are kept till two. On the clay soils, where there is little to get except the weeds in the fallows, a very inferior class of sheep prevails; apparently a kind of cross of the old forest breed, spoken of by Mr. Lowe—a kind of hard-bred sheep, the profit of which is perhaps more than problematical.

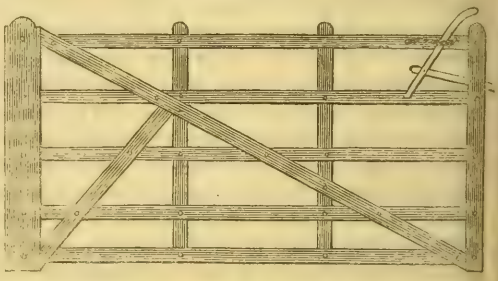
Of the agricultural implements of the county little can be said: they are evidently much behindhand, and do not by far make the most that can be made in this respect by recent improvements. Few Finlayson's harrows, fewer Ducie drags, and still fewer clod-crushers,—these sheet-anchors of both strong and light land cultivation are to be found. Single-horse carts are little appreciated, and used by few farmers. Mr. Short, of Martin, and Mr. Watson, of Walkeringham, are here a little beforehand with their neighbours; but in nearly every farmer's hands you see an enormous waggon, sufficient at any time to load one horse, and this is being driven about as if the heavy horses were kept solely for the purpose of exhibiting it. It is to be hoped this relic of ignorance or prejudice will ere long be abandoned. The Worksop drill is perhaps the best implement used in the county. Though somewhat uncouth in appearance and workmanship, it is an exceedingly useful implement, and has done great things in drilling manures with the seed on the ridge system of turnips. It is in the hands of almost every farmer, and is well calculated to attain the object of well depositing the seed and manure on the ridge, prepared and previously more substantially manured.

The swing plough is generally in use, and chiefly somewhat too clumsy for the light soil it cultivates. A few wheel-ploughs are in use. Mr. Hodgkinson has a most useful plough for ploughing leys. A contrivance in the shape of an oblique knife cuts off the edge of the furrow, which lies uppermost, and it is thrown into the interstices under it. Thus all plants are thoroughly buried, which he finds much facilitates the operation of hoeing, and saves much cleaning of the land afterwards. Mr. Parkinson has a contrivance for covering-in the manure, which is attached to the plough, and is necessary, owing to the mode he adopts of ploughing-in the manure in autumn, to be worked in the land. An attempt has been made to convey an idea of it in the accompanying sketch.



A somewhat rude drag-harrow is in much favour. It is surely the original harrow, but of large dimensions. It is ill-calculated to effect its object.

The farm-gates are useful and economical. A sketch will show that the mechanical principles of hanging, as well as durability, are very closely kept in view.



The manure-heaps are not economized in the very best manner; the liquid manure too little preserved; the mixen too often laid by the roadside, luxuriating the nettles—its rich essential quality subsiding or escaping, the one into the gutter, the other into the air. All this they restore, indeed, by purchases of cake; but how lamentable that it should be allowed to escape at all, when it might be prevented by covering the sides and top with earth, as adopted by Mr. Parkinson! Many farmers would be surprised at the little care which is taken to produce fermentation in the mixens. Mr. Lessiter carts out his manure in May for use in June: its richness—fulness of artificial food by which the stock is maintained—accounts for this rapid decomposition, as well as its power upon the plants. Compost-heaps are by no means uncommon: a greater than average attention is paid to them. Peat is collected, or pond clearings, and mixed with lime for subsequent use; or road-scrapings are collected, and mixed with manure or lime.

Gypsum, which is found in some parts of the county, near Newark, and also near Misterton, has been applied in various ways, but with very little success. It is unsuccessful in preventing clover sickness, and, if useful for any crop, it appears to be potatoes. It is little used, however, except for purposes of manufacture.

Hop cultivation still prevails, though most hop grounds have been given up. The quality is certainly inferior to the Kent hops; they are destitute of that peculiar bitter flavour, and have a peculiarity in its stead which it requires habit to relish. They are cultivated with great care, are very expensive, but in an ordinary season are very profitable crops. Mr. Parkinson (who, however, has renounced their cultivation) has grown as many as one ton per acre—a quantity seldom equalled, and rarely if ever exceeded. It is most extraordinary that no essential improvement has taken place in their cultivation. They require liberal manure, but not of the more stimulating character, as such is said to produce mildew. It is said that a sound plantation will thrive for forty years; and when taken out of hops and thrown down to other crops, the fertility of the ground is almost illimitable. It may be a question whether the seeding of the clover-leys for two years is correct, or the reverse (the light soils are alluded to): in other words, whether the four or five-course shift is the most profitable and judicious. Mr. Lessiter says—and his judgment is exceedingly strong, and his opinions highly practical—that the land will not bear frequent stirring: it deteriorates the crop and the yield. Mr. Peck, of Tiln, who occupies some of precisely the same description of soil, says that he finds it best to plough up the leys after the first year, because in the second year the good grasses are displaced by the duffil grass, which, while it impoverishes the soil, is not eaten by the stock. The solution of the secret undoubtedly is, that those farmers who use cake in the summer to aid the leys, find they secure better crops in the two years than in the one year's ley, because the former has not only had upon it a double quantity of stock, but also a double supply of cake, and which brings the case to something like a similarity. Mr. Peck drills rape-dust with his wheat. The difference, therefore, resolves itself into the profit or loss of the sheep kept upon it—whether it is more profitable to turn cake into mutton upon the extra year's seeds, or to apply it directly to the wheat. If practice were to decide, it appears to be generally in favour of the former, it being more generally adopted.

In our last paper we made a mistake of ten inches, in stating the width of Mr. Watson's beans. He drills at *thirty-six* inches; and sometimes sows with the last hoeing half-a-pound of turnip-seed broadcast, and has sometimes very good crops of turnips.

The wild, uninclosed forest has been alluded to. It is stated by persons competent to give a correct estimate, that one-third of the forest is still uninclosed and uncultivated. That the whole of this might not only be made useful, but highly productive, and grow its magnificent crops of turnips and corn, and feed its splendid sheep, there can be no doubt; and it is impossible to see the gorse and heather, the blowing sand and staring herbage occupying the one, and the rabbit, the field-mouse, and even the squirrel and nightingale displace the other, without feelings of the greatest regret. To the eye of the tourist it may be more in keeping with the parliament oak and ruined castle—more grateful in recalling historic recollections—more calculated to awaken reminiscences of Robin Hood and Sherwood Forest; but all these must give way before the all-important object of feeding our population, and bringing out the capabilities of a soil, which only wants the spirit, and capital, and skill, of the Nottinghamshire farmer applied to it to make it a garden of cultivation—a model of agricultural perfection.

Sowerby, Thirsk, Jan. 1.

GRASS SEEDS.

(*From the German.*)

It is stated that the failure of grass seeds, when sown for permanent meadow, is frequently to be attributed to previous mismanagement of the seed. Should there have been *any* heat in the stacks, the vegetative power of the seed is certainly injured, and none more readily than one of our best grasses—meadow fox-tail (*alopecurus pratense*). Nothing can be more ill-judged than a niggardly economy in the purchase of grass-seeds; and as the farmer is quite at the mercy of the person he purchases from, we would strongly urge the necessity of dealing with respectable men.

The seeds of our cultivated grasses are also of very various relative sizes as compared to their weight, so that if ever the same weight of each seed be sown, very different numbers of seeds will be sown on any equal space of ground. For instance:

1lb. of *agrostis capillaris* contains 8,000,000 seeds, so that 1lb. per acre gives 1600 seeds per square yard; 1lb. of *avena elatior* contains 100,000 seeds, so that 1lb. per acre gives 11 plants per square yard. 1lb. of *phleum pratense* contains 1,300,000 seeds, so that 1lb. per acre gives 270 plants per square yard.

C. E. D.

WHAT HAS CHEMISTRY DONE FOR AGRICULTURE?

BY J. CAMERON, ESQ., ASSISTANT IN THE LABORATORY OF THE AGRICULTURAL CHEMISTRY ASSOCIATION OF SCOTLAND.

The economizing of manures is perhaps not the least important service rendered to agriculture by chemical science. In many cases the large sums of money which are expended annually by some individuals in the purchase of foreign manures, might be laid out to better advantage by saving at home many substances hitherto considered worthless, and consequently allowed to run to waste from year to year, having no other end than rendering still more impure the air of large towns, and polluting the streams which flow charged with it to the sea. There are many sources from which substances of a highly fertilizing nature may be obtained, which hitherto have not been used to any considerable extent in agriculture. Many of these substances, both liquid and solid, may be obtained in large towns at a comparatively low price; and although they might not answer all the purposes to which they might be applied by the unskilful husbandman, still when their constituents were made known by the chemist, they might, when judiciously mixed with other ingredients, answer the purposes of the farmer better than some of the foreign manures which he has been in the habit of purchasing at a very high rate. Wherever animal or vegetable matter passes through the various processes of the manufacturer in preparing it for the consumer, there must necessarily be a certain degree of waste or refuse material left, which the manufacturer considers of no more use. Consequently it is either carted away to some distance from his premises, or is sent down the stream to swell the impurities of the water, and, perhaps, engender sickness in many of those localities in its neighbourhood, where the air which is inhaled is always more or less contaminated by such unwholesome odours. In the distilleries of Scotland there is a large amount of grain used, and in consequence of the various operations through which it must pass in the preparation of spirits, a considerable portion of soluble matter is left in those refuse liquids in which it is partly prepared for the purposes of the distiller. Whilst on a visit to Islay, Professor Johnston observed a pale turbid-looking liquid discharged copiously into the sea near Port-Helen, in the neighbourhood of a large distillery. On inquiry he learned that the milky liquid proceeded from the distillery, and consisted of the refuse left in the still after the first distillation. The proprietor used some of it, but his neighbours did not consider it worth carrying away. About 10,000 gallons, according to the information given by the proprietor, of this liquid is discharged annually from his distillery into the sea. When the quantity from the other distilleries in the same island, lost in a similar way, is taken into account, the quantity lost will be found to be very considerable when its value is made known by an examination of its constituents. By the chemical examination of two bottles of this liquid brought to the laboratory of the association by Professor Johnston, it was found to contain many of those ingredients which are the most valuable in the food of cattle, and also those rich fertilizing elements of nutrition calculated to minister to the growth of vegetation. One of the samples was thinner than the other, in consequence of its being that which subsided to the bottom of the tank, into which it was first run off from the still. Every five gallons of the thinner liquid, on evaporation, was found to contain upwards of three pounds of solid matter; or every 10,000 gallons of this liquid, which was allowed to run into the sea, carried with it upwards of 6,000 pounds of solid matter capable of nourishing both the plant and the animal. This solid matter was found to consist partly of organic and partly of inorganic matter. The organic matter consisted chiefly of gum, sugar, protein compounds, starch, all changed to a certain extent, but all capable of promoting the growth of both plants and animals. The inorganic part of this solid matter was found, on analysis, to consist, in every 100 parts, of—

Potash and soda, with a little sulphuric and muriatic acid	46.24
Phosphoric acid, combined in the liquid with some of the potash and soda	21.67
Phosphates of magnesia and lime	28.88
Silicious matter	2.56
Loss	0.65
	100.00

From a glance at the composition of the above inorganic part of the refuse, it will at once be seen that a very serious loss is incurred annually by agriculture, when such valuable substances are allowed to run into the sea. The quantity of phosphates present is very considerable; in reality, it consists chiefly of phosphoric acid in combination with lime,

potash, soda, and magnesia. In promoting the growth of plants and animals, the phosphates are very powerful and necessary ingredients. The bones of animals contain a large proportion of the phosphates of lime and magnesia, which the animal obtains in its food from the plant. The plant obtains it from the soil to build up its own body, which, in its turn, contributes to build up the frame of the animal which receives it for food. The thicker liquid was also examined, and found to contain a large proportion of nutritious matter. Every two imperial gallons of this liquid contained upwards of three pounds of dry food—about one-fourth more of dry food than is contained in an equal weight of turnips. The organic part of this thick liquid constituted its principal bulk; so that the gum, sugar, starch (a little changed), and protein compounds, formed the most considerable proportion of the solid available food contained in the liquid. The ash which it left on burning was also submitted to chemical investigation, and found to containe saline materials in combination with phosphoric acid, which could not fail to prove highly beneficial in promoting the growth of both plants and animals. The following is the composition of the ash, or inorganic part, per cent.—

Potash and soda, with a little muriatic and sulphuric acid.	38.36
Phosphoric acid, combined in the liquid with potash and soda	24.35
Phosphates of magnesia and lime . .	15.90
Silicious matter.	20.95
Loss	0.44
	100.00

In many parts of the North Highlands the poor inhabitants depend principally for the manure of their land upon the sea ware that is washed ashore along the coast; and in many seasons their expectations may be disappointed unless the prevailing winds prove favourable. But if they were made aware of the value of those substances which in some parts are running to waste daily in their immediate neighbourhood, advantages calculated materially to improve their condition and increase their produce would be the result. The wild ferns and stunted heath with which many of the poorer classes in the North Highlands have to bed their cattle with when straw is scarce, are but very indifferent substances to mix with the dung heap, unless there be a very considerable proportion of rich farm-yard manure present to decompose them. Such liquids as those mentioned above might not only prove serviceable in the form of manures for corn and grass crops, but from their composition would appear to be well suited for the feeding of cattle. Every pound of material possessing properties analogous to those of the distillery liquid, which is carried into the sea, is so much lost to the capital of the country. As the old Scotch proverb says:—"A penny saved is a penny won."

But there are many other kinds of liquid manure lost to agriculture both in the towns and in the country, which, if saved, might amount to little short of a national benefit. The urine of some animals is well known to possess fertilizing properties equal to guano, and in a state which is most readily serviceable to the growing plant; and when we take into account the quantities which are lost annually of it, we cannot but conclude that chemical science has conferred a very important benefit on the community by pointing out to the agriculturist the very serious loss which is incurred by allowing it to escape into the sewers, and from thence to the sea. It is but very recently that a spirit of activity has been evinced in some of the large cities of this country towards saving this valuable ingredient. But even with all the advantages before them which the saving of this material would realize, there is, as yet, scarcely any permanent arrangement made by those who have the power, and who ought to feel interested in the public weal, to save a tithe of that which is lost daily.

But the urine of all animals is not equally valuable as a means of increasing the produce of the soil. The urine of most of the herbivorous animals, with the exception of the *hare*, is not, as far as it has been examined, so rich in those materials which are suitable for the generality of crops, as is that of man and of the pig. The urine of the herbivorous animals is generally destitute of very important ingredients, viz., phosphates, which are either not present, or else in so small a proportion as not to affect the composition of it in any material degree. The urine of the sheep was examined some time ago in the laboratory of the Agricultural Chemistry Association of Scotland by Mr. Fromberg, and although found to contain very rich fertilizing substances, it was deficient in phosphates, for the same reason probably as the urine of the ox and the horse is destitute of this ingredient—that is, on account of their solid excretions containing the phosphates which are taken up in their food. The following table shows the composition of the urine of the sheep as examined by Mr. Fromberg.

On evaporation, every ten gallons of the urine was found to contain seven pounds of dry fertilizing substance. This dry matter was found to consist of—

	Per cent.
Organic matter, containing nitrogen	71.84
Inorganic matter	28.14
	100.00

Composition of the ash, or inorganic part—

	Per cent.
Sulphate of potash	2.98
Sulphate of soda	7.72
Chloride of potassium	12.00
Chloride of sodium (common salt)	32.01
Carbonate of soda	42.25
Carbonate of lime	0.82
Carbonate of magnesia	0.46
Phosphates of lime, magnesia, and iron.	0.70
Silica	1.06
	100.00

It will be seen from the above analysis of the inorganic part of the solid matter contained in sheep's urine, that a very considerable proportion of it consists of the salts of soda—viz., common salt and carbonate of soda. These, along with the other substances present, are very valuable fertilizers, but would prove, undoubtedly, more beneficial to the land if mixed up with the solid excretions of the animal. The organic part, when submitted to examination, was found to contain a considerable proportion of urea—a substance which gives its principal value to Peruvian guano, and which, during the fermentation of urine, is converted into carbonates and other salts of ammonia.

Mostly all the other substances contained in urine are highly fertilizing in their effects when applied to any given crop; but it is the urea contained in it that renders it so valuable as a rapid promoter of vegetation. The following table, according to Berzelius, shows the composition of human urine—

Water	933.0
Urea	30.1
Uric acid	1.0
Free lactic acid, lactate of ammonia, and animal matter	17.1
Mucus of the bladder	0.3
Sulphate of potash	3.7
Sulphate of soda	3.2
Phosphate of soda	2.9
Phosphate of ammonia	1.6
Common salt	4.5
Sal-ammoniac	1.5
Phosphates of lime and magnesia, with a trace of silica and fluoride of calcium	1.1
	1000.0

The presence of the phosphoric acid, in combination with the alkaline salts, renders it more valuable than the urine of the horse or the cow, and would make it more effectual in promoting the growth of the generality of our cultivated crops. Hence the necessity of saving as much as possible of it for the benefit of agriculture. Many thousands of pounds sterling are lost in our large cities by the waste of this and many other substances, possessed of properties that would render the surrounding pastures much more luxuriant than they generally are, and consequently increase the quantity of milk in the neighbourhood of such densely populated places. It has been so in the immediate neighbourhood of Edinburgh to a certain extent. By irrigation from the common sewers of the city, the pastures in the neighbourhood may be seen perfectly green in the dead of winter, when the surrounding lands are barren and bleak. In the summer time these pastures yield very rich crops of grass, which has enhanced their value considerably of late years. Those parts which belong to the city bring a very high rent, which consequently has increased the revenues to a very considerable amount. —Scottish Farmer.

AGRICULTURAL LANDLORDS AND TENANTS.—"There is no axiom in geometry more indisputable than that the power, the influence, the very existence of the men of landed property depend upon the well being, the riches, the activity of those in the lower spheres of life. A man who is poor can never pay a rent; a man who is dependent upon the will of another for subsistence, can never be actuated by that energetic spirit which alone can stimulate to arduous undertakings." So wrote Mr. James Anderson, seventy years ago; and yet, though every one must admit the truth of his assertion, how little has it hitherto been attended to! In the letting of the farms, for instance, too frequently the highest rent is eagerly grasped at, with but little consideration whether the tenant will be able to raise the rent from the land or not, and without affording available facilities for raising the greatest possible amount, and consequently the tenant fails, the landlord loses his rent, the land is impoverished, and the community is injured. Again Mr. Anderson says "All essential improvements whichever be carried on by the lower ranks of people; but a dependent mind will never adopt one, however plainly it may be pointed out." This is evident from every-day experience, and hence we have ever contended for making the agricultural tenant as independent of his landlord as possible, by making his tenure certain for the stipulated term, whatever contingencies may happen, and securing to him remuneration for the permanent improvements he makes. This every landlord should do as far as he is able, and what lies beyond his ability should be provided for by an act of Parliament. Until something of this kind is done, both for Great Britain and Ireland, agriculture in these countries will never attain that perfection of which it is susceptible, nor disagreements and jealousies between landlords and tenants, and lessees, and inconvenience to both parties cease. Nor would the benefit of such arrangement be confined to the landlords and tenants; it would extend to the labourers also, as it would give them more employment and better wages. In fine, what Shakspeare puts in the mouth of Lord Talbot as saying of his soldiers, may with greater propriety be said of the landowner respecting his tenants and their labourers:—

"These are his substance, sinews, arms, and strength."

—Sherborne Mercury.

ON THE MANUFACTURE OF MANURES.

(ABRIDGED FROM THE FRENCH OF DUMAS.)

No sooner was the importance of ammoniacal manures fairly recognised, than efforts were made to collect every substance which contained ammonia in any appreciable quantity. Manure manufactories, with the above end in view, have been established in every important town of France. These manufactories are quite a novel feature in the application of chemistry, and are intended to supply to the farm such assistance as no internal management can afford. They will, in the end, most assuredly augment the produce of our fields, and convert many injurious substances into a real national advantage.

All animal matters give manures very rich in ammonia, and at present they are mostly used in a natural state. This will do very well when the farm is at hand, and the substances can be at once applied to the soil; but to carry them any distance—to stop putrefaction, to render their effects more regular and constant—animal matters must be submitted to some degree of preparation; and if this preparation be properly managed, all the above benefits will be secured, as well as preventing the communication of any bad smell or taste to the vegetables.

1. It is in the *abattoirs* that animal manures may be best prepared, and thus render valuable what would otherwise be lost.

To preserve blood to an indefinite period, it is coagulated by boiling, either in a common furnace pot, or, what is preferable, by means of steam. The coagulated part is removed as it rises, by means of a scoop, and dried in the air. In this state it may be reduced to powder, and transported without inconvenience to any part of the world. In this form it is a very rich manure, containing 13 to 14 per cent. of azote.

In the *abattoirs*, after boiling the carcasses, by means of steam, in a wooden receptacle, the flesh is removed from the bones, dried in the sun, and pulverized. This also is a very rich manure, and is in a form capable of being transported to any distance. It decomposes much more slowly than when in a fresh state, and consequently is a more lasting fertilizer. It is also very valuable to manufacturers of prussiate of potash, and is even used for *fattening pigs*. This dried flesh has recently been employed with success for the growth of the sugar-cane, for which purpose its riches in ammonia seems to render it very suitable.

2. Bones, when properly prepared, are now a recognised farmers' assistant. [In France, before applying them to the soil, they are deprived of the gelatinous matter by heat: and there seems to be a growing conviction that the abstraction of this substance actually increases the value of the bones, as manure. We feel at a loss how to explain this fact; nor do the speculations of scientific men, in the present state of our knowledge, appear to be of any service in the way of explanation. But it appears to be the opinion of those farmers who use them most extensively, that bones are actually improved by boiling.*] We must never overlook the importance of the phosphate of lime of bones, in practical farming; for the end of the farmer's labour is to sell *corn and beef*, the bases of which are the earthy phosphates. To this end, the most self-evident process consists in spreading on the soil the urine and the excrements of the men whom the wheat has fed, and the bones of the animals whose flesh has been sold.

We live in hopes of seeing the natural phosphate of lime of Estremadura, in Spain, employed in agriculture, and its use producing an appreciable effect on the extent of our corn crops.

3. Amongst other manufactured manures, that best known and most extensively employed is *the poudrette*, or prepared nightsoil. A large manufactory, established at the very gates of Paris, has given to this substance, which previously had been as useless as it still is in the other European capitals, a very important commercial value, by putting it into a form capable of transport to any distance.

But it must be confessed that the means employed to manufacture poudrette, at Montfaucon, are excessively barbarous, and seem chosen for the double purpose of wasting the ammonia and rendering the neighbourhood unhealthy. Nevertheless, as it is better to do anything rather than waste the whole of the animal excrements of our large towns, we will briefly describe the method adopted near Paris.

The great requisite in the manufactory consists in six or seven large tanks, so arranged that they may be emptied from one to another. The largest of these is situated about 100 feet above the river Seine, into which the solid and liquid excrements are emptied. Some idea may be formed of the ex-

* Translator.

tent to which the manufacture is carried by the size of this reservoir: it is actually about 100 yards long, half as wide, and nearly 10 yards deep. In this first tank the whole is allowed to settle, and the liquid part drawn off into a lower tank by means of a conduit, where it is again allowed to settle; and so on until, by the time it has reached the lowest, all the solid insoluble matters are effectually separated. The lower tanks contain from 50 to 80 square yards, and are not so deep as the upper one, because the great bulk of the solid matter is deposited in the first. The great defect in this manufacture is the want of two large tanks instead of one, into which the excrements may be first emptied, causing great confusion when it is necessary to empty the one they have.

When the excrements are drained as much as possible in the tanks, they are taken out and spread over a field attached to the works. A good deal of hand labour is here bestowed on them, for the purpose of drying them more perfectly; when this is effected, the whole is easily reduced to a powder, and the poudrette is ready for sale.

The daily quantity of solid and liquid excrements received at the manufactory amounts to nearly 600 yards, yielding about 100 cubic yards of poudrette.

Within the last few years this manufactory has been joined by another, for the purpose of converting the ammonia of the waste liquid into sulphate and carbonate. This poudrette generally sells at the rate of 1s. per bushel.

Notwithstanding the manufacture of ammoniacal salts above mentioned, the greater portion of the watery solution is still allowed to run to waste. Great expense has recently been incurred to transport the whole of the liquid from the first tank to a distance from Paris into the Forest of Bondy; and though this has been done, no more use has been made of the liquid than at the first place. This is much to be regretted, as it contains such an amount of azote as to represent, in this respect, a value to agriculture two or three times greater than the excrements reduced to poudrette. There can be no doubt but that at some future day the whole will, in some way or other, be rendered available to the community. I would also strongly urge upon those interested in the matter to endeavour to secure the whole of the ammonia by converting it into a sulphate.

Since the progress of chemistry has pointed out the possibility of employing this salt as a fertilizer, a host of experiments in various parts of Europe have been made to ascertain its value.

We particularly direct attention to the experiments of Kuhlmann, of Lille, and those by Schattenman, as throwing most information on the subject.*

If, then, all these experiments point out the value of sulphate of ammonia, and chemistry tells us that it contains 21 per cent. of azote, we may form some idea of the immense value to agriculture of the waste water from the poudrette manufactory at Paris, if the ammonia could be converted into sulphate.

We do not for one moment say that the ammonia of the poudrette is the sole criterion of its value: the various salts which it contains are unquestionably a useful addition to nearly every soil. The organic matter present in the poudrette must also have some effect on vegetation.

How should the sulphate of ammonia be applied to the soil? This is yet an unsettled question. Some have recommended to dissolve it in water, and apply the solution to the soil; but this method is too tedious to be generally useful. It is probable that the best effects will be produced by sowing the sulphate of ammonia (either alone or mixed with soil and chalk) on the surface of the soil. It is necessary to choose a proper season for this application, as the stimulating powers of this salt are rather apt to be injurious to vegetation, if it be applied when the ground is very dry. It must, however, be admitted that in some of the experiments which have been tried by this method the results have not been so satisfactory as could be wished.

4. The value of the refuse animal charcoal of the sugar refineries, as a manure, has long been known. Unfortunately, the short supply and high price of this article prevent it from ever being extensively used in agriculture. It has therefore been proposed to manufacture a manure possessed of the valuable properties of this animal charcoal. This is now effected by mixing human excrement with a cheap charcoal, at once effecting two purposes, namely, disinfecting the excrements and fixing the ammonia.

This manure, which has been named "*animalized charcoal*," is a mixture of carbonized vegetable earth and the clearings-out of the common sewers. By this means there is produced a substance which possesses most of the good properties of the animal charcoal of the sugar refineries. As already named, the charcoal has the remarkable property of absorbing all the ammonia as it is generated, and again giving it out very slowly as required by the plants. This check upon the fermentation is exceedingly valuable, for the great inconvenience attending the employment of fecal matter consists in too quick and evanescent an action.

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* See "Farmer's Magazine" and "Mark Lane Express."

It is necessary to choose for carbonization a soil containing as much vegetable matter as possible; and, should it contain any clay, care must be taken not to burn it into lumps.

Though the manufacture of this animalized charcoal is as yet capable of much improvement, we consider it a great step in advance of the poudrette; because there is not the offensive smell, which is one of the greatest disadvantages of the latter, and it can be manufactured immediately on the arrival of the excrements, whilst the poudrette must be conducted from one tank to another as slowly as possible. These two manures are nearly equal in value, when their general constituents are compared, though the animalized charcoal is slightly richer than the poudrette in azote or ammonia. The former, in a dry state, contains at least 3 per cent. of azote. Boussingault and Payen have stated that they have found as far as 4 per cent. in the poudrette of Belloni, but that of Montfaucon only contains 2·67 per cent., and the ordinary samples contain only 2, and sometimes even only 1·6 per cent. of azote.

It will be perceived that, from the method pursued in the manufacture of these two manures, the poudrette will contain in a similar bulk more phosphate than the animalized charcoal. Under the present state of our knowledge of agricultural chemistry, it would be premature of the scientific man to pronounce decidedly on the relative value of different manures. For instance, as we are ignorant of the proper proportions in which ammonia and phosphates ought to be present in a manure, so as to be best adapted for producing a vigorous growth, we know not but in this respect the animalized charcoal may be more valuable than poudrette.

A company has been formed in one of our large towns* for the manufacture of animalized charcoal, and by them the process is divided into two principal parts: first, the extraction of the fecal matters from the common sewers, their transport to the manufactory; and, secondly, their transformation into manure.

Before extracting the fecal matters from the sewers, they are always disinfected, and two substances have been employed for this purpose, and been found nearly equally useful. The first is the refuse sulphate of iron, which can, in the neighbourhood of the manufactory, be procured at a very low price. The action of this salt is easily understood.

Another mixture which the company sometimes employs for this end is a solution of the sulphate of iron, which is first poured into the sewer, and then an equal quantity of common soap (in solution) is added. A metallic oleate is thus formed, which appears to be more easily decomposed than the sulphates, by the influence of sulphuretted hydrogen and hydro-sulphuret of ammonia.

The object of both these mixtures is to convert the volatile salts of ammonia into the more stable sulphates.

The fecal matters are extracted from the sewers by means of a small machine, resembling those employed in cleaning out the beds of our navigable rivers. It is worked by hand labour, and so arranged that the matter lifted is at once emptied into carts, without being at all exposed to the air. In addition to this precaution, the apparatus is rendered as air-tight as possible; and before any of the noxious gases can escape, they are made to pass through a small apparatus containing chloride of lime.

The whole is then carted to the manufactory, and must be at once converted into manure, for the disinfection of the sulphate of iron, &c., is found to be only temporary. It is therefore at once thrown into large basins, and mixed by means of shovels with nearly an equal volume of carbonized earth. It is then spread out over a field, and worked about with rakes until dried, when a farther quantity of fecal matter is added, and the whole again dried. This operation is repeated until the carbonized earth only forms one-fourth of the whole, which generally happens with the third mixture, if the work has been well done, and especially if the fecal matter contains a large proportion of solids.

The whole operation, by the employment of the carbonized earth, causes scarcely any offensive smell. It mostly requires about one month in summer and two months in winter.

The carbonized earth was formerly prepared in common iron pots, but recently a very ingeniously-shaped furnace has been employed for this purpose.

5. The value of a manure can only be determined by one method, namely, practical experiment: the true province of chemistry is to furnish directions and suggestions for the best way of making the comparative trials. For instance, chemistry may determine by analysis the nature and quantity of the mineral and organic materials which any crop withdraws from the soil. The ordinary crops require earthy phosphates, alkaline salts, potash, and sulphur: the whole of these substances must be present in the soil or manure, or we shall assuredly be disappointed in the result.

Chemical research has now clearly shown the part which ammonia or azotized matters act as manures. On this point no doubt now exists; manures must always contain either ammonia or azotized matters capable of producing it.

* In France.

But when vegetable substances and the droppings of our farm cattle are mixed together, they form a mixture which must contain both the salts and ammonia required by vegetation; and we have a manure of universal value and application. I would also strongly urge upon those interested in the question the utmost possible care of the liquid manures of the farm; as my opinion is, that these are valuable not merely on account of the ammonia present, but also for the ulmic acid they contain. The action of these vegetable acids is, however, yet a disputed point in agricultural economics.

The results of many of the experiments which have been recently made with ammoniacal salts would seem to show that we have only to add these salts year after year to insure a vigorous vegetation in our fields. This appears to me to be a serious error, and I have no doubt but, if persisted in, it will be found that, by adding *only one ingredient*, and *removing the various and complicated inorganic matters of our crops*, comparative sterility will be the result. It is only by the use of such manures as poudrette, nightsoil, animalized charcoal, farm-yard manure, or any of these compound manures, that the farmer can depend for permanently fertilizing his land.

It is very much to be regretted that no means can be devised for employing the nightsoil of our English towns. There can be no doubt but that many thousand tons of manure as rich as guano are yearly wasted by our present social arrangements. Could this but be rendered available, we would certainly be independent of foreign supplies of bones, &c., and possibly even of the quantity of foreign corn we are now compelled to purchase. It is truly a national question, and well worthy the attention of government; and not only is it important on account of agriculture, but also for its bearing on the now all-absorbing question of public health. In both these respects, then, we look with interest on the efforts of the London Sewage Company, and cordially wish them success in their undertaking. One reason which has induced us to publish this paper is to furnish information as to the plans adopted in other countries for converting into a valuable manure the filth and offals of our crowded towns.

IMPORTANT INFORMATION RELATING TO THE CULTIVATION OF ROOTS.

The following important statement was made by the judges, at the Faringdon Agricultural Meeting:—

We, the undersigned, having inspected and weighed portions of the crops of Swedes and mangel-wurzel entered in competition for the Earl of Radnor's premiums, and also taken into our consideration the conditions on which the said premiums are offered, do make our award as hereinafter stated.

On the suggestion of Mr. Pusey, we requested each competitor to furnish us with a brief statement as to the cultivation of the land on which their several crops were growing, and we have thought it might be interesting to the members of the Association, if we furnished a few extracts from these papers—

We allude to the crops in the order in which we visited them.

No. 1.—Mr. Pusey, in a paper handed to us, says—

"As the prize is offered by Lord Radnor for the best crop, with reference to the quality of land and cultivation, it is right to give the judges some information respecting each.

"The quality and condition of the soil are shown by the places where the manure is purposely missed.

"As to cultivation it was a wheat stubble, one bed of couch grass; it was ploughed and backbouted in winter, and thoroughly cleaned in spring, which last operation made the land very dusty, and threw the seed time late.

"The manure and its cost per acre was as follows:—

8 Bushels of super-phosphate, at 7s. per cwt...	£2	2	0
1½ Bushels of bones mixed with sand.....	0	4	0
1 Bushel of guano.....	0	7	0
	£0	13	0

"I consider the expense of this manuring very moderate, as I have seen tenant farmers go to the cost of £5 per acre, which is nearly double, and that upon better land.

"There is no dung, excepting upon a piece entered for a sweepstakes, which I believe to be six acres.

"Pusey, Oct. 29, 1847." "PHILIP PUSEY.

No. 2.—Mr. Williams states that Sir R. Throckmorton's Swedes were grown after peas (the two preceding crops having been red clover and wheat), and that about 10 one-horse loads of dung per acre were applied. Drilled July 1.

No. 3.—Mr. Wm. Gerring says that his Swedes were sown broad-cast, with about 14 loads of ordinary yard dung per acre, the previous crop having been wheat.

No. 4.—Mr. Nash states that his Swedes were sown after wheat, and were manured with common yard dung.

The following table will give the weight of the several crops:—

No.	Name.	Weight per acre. Tons.	Cwt.	Qrs.
1.	P. Pusey, Esq., M.P. ..... (Soil very poor, nearly sterile in its natural state.)	18	5	0
2.	Sir A. Throckmorton, Bart. ..... (Soil also a very hungry one, near the Warren.)	13	7	0
3.	W. Gerring..... (Soil various, but very useful loam.)	22	15	2
4.	J. Nash ..... (Deep loamy soil, but no cultivation could render it productive in the wet state in which we found it.)	11	7	0

We have pleasure in stating that considering the season, &c., the whole of the crops inspected were very fair, but we cannot

forbear specially alluding to the remarkably fine and extensive one exhibited by P. Pusey, Esq., M.P. From our previous knowledge of the fact (as well as from small portions left unmanured, &c.) we can most fully confirm Mr. Pusey's statement as to the condition of this land only twelve months ago, and we were highly gratified at witnessing so complete a change in so short a period, to which the luxuriance of the plants growing upon it so amply testified. In consequence of the whole field being entered, it was necessary that we should weigh several poles in different parts of the ground to arrive at the average weight, and the result has shown a very great produce for such land in almost any season. Had, however, Mr. Pusey selected six acres, as he was entitled to do, and as the other competitors did, the weight per acre would have been still more surprising.

It might probably be thought beyond our province to enter upon any discussion of the details of the practice as furnished by Mr. Pusey, by which this result has been accomplished, but we could not omit allusion to the fact.

The prize is awarded to P. Pusey, Esq., M.P.

THE GIANT SAINFOIN.

Sir,—Having noticed this new variety of sainfoin in my agricultural report on two or three occasions last year, I find that some of your correspondents desire to obtain further information thereon. Although I may not be able to satisfy every inquiry, having no object in view in my monthly report but to serve the public, and finding it difficult to go into these matters at all at large on those occasions, I embrace the first leisure half-hour to address your agricultural readers more particularly upon the subject.

I have previously stated that we cannot trace the origin of this new species of sainfoin. It is supposed to have been imported by a London merchant, and accidentally a small quantity was sown by a farmer in Hertfordshire, to finish the seeding of a field, the greater part of which had been sown with the common sort, by which means its superiority became the more easily tested; and which was so manifest, that for several years the lucky farmer had no difficulty in making four and even five pounds per bushel of the seed arising from this crop; the more so, of course, from his desire to get a greater extent on his own farm, added to the fact that it propagates its own species but slowly.

A merchant in the neighbourhood, who also farms his own estate, being aware of the circumstance, has, for several years, imported small quantities of sainfoin-seed from different countries, under the hope of obtaining the same variety, and of course at a much smaller cost; but the last time I saw him, he said he had hitherto invariably failed in his object. Its superiority mainly consists in its rapid growth, and its power of seeding after having previously produced a crop of hay the same season; and it will even then yield an eddish by the end of October, while the common sort will not seed at all after mowing. I have this year seen fully two tons of hay per acre carted off the land the first week in June, and afterwards a crop of seed thrashed, and the stover (of no small value) stacked by the 10th of September. It is, I believe, generally most productive of seed the second year—when on a suitable soil, it will produce from three to four quarters per acre—about this time it seems generally to have attained its maturity, but seldom fails much the third year; but after then, I think it better husbandry to plough it up, and replant in another part of the farm; because if continued longer it invariably gets foul and grassy, and is damaging the land for future crops; whereas, if taken up now, well pressed, with a dressing of rapecake, it will produce as good a crop of wheat as any on the farm. And certainly no part of the farm (even allowing for the heavy cost of seeding) will have produced in the three years to anything like the same value.

I fully agree with Mr. Hine (who, by the bye, is a very practical farmer of considerable experience) as to the mode of planting—that by far the most profitable way is to drill-in about three bushels of seed between the rows of pea-stubble wheat, the land being previously in a good state; or, in the event of having no wheat of that sort, wheat drilled after turnips or mangold wurtzel would be equally favourable. The advantage of this kind of preparation is, that you get a close subsoil with a finely pulverized surface, which is the great secret in getting a plant, and which is often difficult to obtain in a spring-sown crop. Besides which, after a successful cropping for three years, the land comes in regular rotation for wheat, with the rest of the season; and in order to keep up the quantity, you have only to drill the like number of acres on another portion of the farm the previous spring to taking up the old crop at Michaelmas.

From my recommendation last year, I learn that, in small quantities, it is now planted through a large district of country where it had not been previously known. In some instances parties begrudged seed; and others have not planted it judiciously, and therefore will probably fail of a plant; in other cases, where suitable directions were followed, they have succeeded; and where the soil is at all suitable, I feel no fear that they will be disappointed; for on all dry and chalky soils, particularly where clover grows but shyly, it will prove, if I do not greatly mistake, the most valuable acquisition to our agriculture which has been discovered in modern times.

Mr. Hine, it seems, disagrees with me as to its becoming a substitute for red clover. I am still, however, of opinion that as soon as the seed shall become *sufficiently cheap* (not before, certainly), on weak, chalky soils, unkind for clover, it will, by and by, be extensively substituted, as a far more certain and paying crop. For the present, the more economical plan is, sure enough, to have to seed only once in three or four years.

Some one gentleman last year expressed his surprise at being charged 30s. or 35s. per bushel, when sainfoin was selling in the market at one-fourth of that price;

and sure enough, if there was no difference, he was sadly cheated; and, on that supposition, Mr. Hart (the first grower of this article in England) gulled his neighbours still more when he charged them 80s. per bushel. This gentleman, it seems, has vended none at present under two guineas, and confidently expects to realize that sum for the ensuing season. But I should think it both impracticable and unreasonable under its present extended growth; and I was glad to hear the other day that Mr. Henry Coles Brown, of Luton, who I know has a genuine stock, fixed his price for the present (in quantities) as low as 25s. per bushel. Having been the means, through the Bedfordshire Report, of bringing this article more generally before the public, where it was unknown, I have thought it right to put your readers so far upon their guard, and sincerely hope Mr. Brown will meet with that encouragement which his reasonable terms of doing business so much entitle him.

I am yours truly,

THE BEDS REPORTER.

THE EPIZOOTIE.

Whether it be the same abnormal state of the atmosphere which of late has been afflicting the vegetable and animal kingdoms, and the human family, cannot well be ascertained; but the supposition of its being so is quite feasible, as the same air is an element of life common to plants, beasts, and man. Unusual sickness and mortality are at present upon mankind, especially in this country; the rot of the potatoes is still going on, and the epizootie, or murrain among cattle, is worse than ever. To this last point we wish to direct particular attention at present.

At the monthly meeting of the Highland and Agricultural Society of Scotland, held at Edinburgh, on Wednesday last, the secretary read a communication from the Board of Trade, to the effect that the epizootie, which was thought to be disappearing, had broken out with greater violence than ever among the horned cattle of Wallachia, and that three-fourths of those which had been spared from last year's visitation were falling victims to it. The secretary said, that though the communication just read had reference to the state of the epidemic in a distant country, the directors conceived it to be their duty to submit to the public all the information conveyed to them on so important a subject, in regard to which Professor Dick, who was present, had promised to give to the meeting the results of his experience. Professor Dick then rose and made the following statement, which we give as of great interest to the public at large:—

Professor DICK stated that pluero-pneumonia was still prevailing with great violence, and varied with the weather. It existed at present to a great extent in East Lothian, as well as in Aberdeenshire and throughout the north. He was informed yesterday, by one of his pupils, who is in practice at Maybole, in Ayrshire, that there has only been occasionally a solitary case for fifteen miles round, during the last twelve months. He considered its origin and propagation to be atmospherical, and attributable to influences to which man and the lower animals were equally exposed; in illustration of which the professor referred to the existing epidemic in the form of influenza, under which he himself was evidently labouring, and in consequence of which the public schools have been partially closed. The disease consisted of active inflammation in the lungs, and in the pleura which covers them and lines the chest. It was attended with great danger, particularly when the pleura was principally affected; and such cases generally were fatal, unless the proper remedy was immediately applied; because when that membrane is attacked by inflammation, being what is called a serous membrane, it very rapidly proceeds to pour out serum and lymph between the lungs and ribs; the chest fills with water, and the animal sinks and dies rapidly. Man, and all the domesticated animals, are liable to the disease, although they may not be equally affected at the same time. Horses, as well as dogs, during the present epizootie, have been less affected than cattle. The disease is not, generally speaking, so fatal in horses as in cattle, because horses being under continual notice were better attended to; the symptoms were at once noticed, and they were seldom lost. The same would be the case with cattle if properly looked after; but too little attention is paid by the breeders and rearers of cattle to the health and comfort of their stocks and the symptoms of their diseases; they, at the same time, are not so much under the immediate observation of their owners, and the symptoms are not so distinctly marked, as in the horse. Indeed the early symptoms very readily escape notice, because they are obscure. To illustrate the treatment required the professor referred to a case in Lanarkshire, where he had been called on for advice; his instructions to the smith or farrier on the property were, that he should bleed when he observed any cough or alteration in the milk or feeding; clean out the bowels by laxative medicine—say 1lb. of Epsom salts, nitre, tartarate of antimony in large and repeated doses; repetition of the bleeding; blistering the sides, and even firing, if necessary. After the inflammatory action has been subdued, tonics should be administered. By following this course the smith had acquired a local celebrity; it was sufficiently simple if adopted at an early stage of the disease, but if it has made a certain progress no reasonable hope of success can be entertained. Where effusion has taken place, of course tapping the chest is the most likely remedy, followed by large doses of iodine. Many, from finding bloodletting fatal, suppose it to be injurious in itself. This is an error arising from want of discrimination as to the stage of the disease. If proper attention was paid to the early symptoms, bleeding, laxatives, antimony, nitre, or calomel and opium, and blistering, would, if adopted in time, generally prove efficacious. In blistering, the skin must generally be scalded, and mustard was the best application.

The Earl of ROSEBERY (the chairman)—Has the number of deaths been great?

Professor DICK.—Very great; but he gave no exact information as to the numbers in this district. Some cowfeeders must have lost from 50 to 60 head each in Edinburgh. The disease is not new. Remembers many years ago having as many as 20 cases, in horses, within six weeks; while, at other times, he would not have above two or three in a week.

The Earl of ROSEBERY.—Is the disease contagious?

Professor DICK did not consider that it was contagious, nor that it affected the ground, or sheds, or cow-byres. The general apprehension of contagion did great injury, by diverting the attention of cattle owners from the real causes of the disease, leading them to place embargoes on their farms, and to

overlook the particular exposures, and the want of cleanliness and ventilation in their stables and cow-houses. A particular wind acting on a steading with a particular exposure, combined with a want of proper attention to cleanliness and ventilation, would produce the disease when no other case of it could be found within ten miles. People were too anxious to search after mysterious agencies, and to neglect those natural and ordinary causes.

The Chairman expressed to Professor Dick, on behalf of the meeting, thanks for his interesting and valuable remarks. The general public will thank him also.—Dumfries Herald.

ANNUAL REPORT OF THE WOOL TRADE.

LIVERPOOL, JANUARY 1ST, 1848.—When in our last annual circular we intimated the necessity of caution, we little imagined the very grave and serious reverses which our manufacturing and general commercial interests would experience during 1847, marking it as a year long to be painfully remembered for the almost unequalled amount of embarrassment it entailed on the trading community. We may, perhaps, principally attribute this result to the enormous excess of money-value of our imports (including provisions) over that of our exports. Whether the amount of imports under the circumstances was excessive, it is not our province to inquire, but under our present limited system of currency we can speak of the effect as most decisive and disastrous. By the adverse influence of the exchanges trade became paralyzed, a frightful depreciation in the value of almost every article followed, and was succeeded by a money crisis of the most intense description. Under these discouragements we are happy to say that we believe wool has suffered to a less extent than most of the raw materials of our leading manufactures, owing to the great caution displayed for a long time past. Prices are decidedly lower, say from 5 to 25 per cent. under the quotations of this date last year. The fall is most evident in Australian, Cape of Good Hope, Russian-*Merino*, and Buenos Ayres wools, which is partly attributable to the undue quantities brought at one time on the market at the London public sales. In domestic and some of the useful qualities of low Foreign, as East India and Egyptian, the fall is less marked, and will range from 5 to 15 per cent. The entries of foreign and colonial wool into this port during the past year, although less in number of bales by 8,000 than during 1846, is fully equal in weight, the excess in Buenos Ayres more than compensating for the deficiency from the west coast of South America. We remark during the year a full average demand for wool for export. This branch of the trade seems on the increase, and since the suspension of the import duty, this market promises to become the great centre for Foreign imports. In the export of wool of home growth we observe a diminution. In the export of manufactured goods we are sorry to perceive a great falling off to most quarters. This is, fortunately, to some extent, made up by increased shipments to the United States; our extending relations with that country now forming one of the brightest features of our prospects. Stocks of Foreign are generally light, and not likely to be increased by any heavy arrivals for some time, as the prices in most of the markets abroad are still too high to allow of shipping to advantage. The stock of domestic wools held by the trade and manufacturers is unusually light: that in the hands of growers will be above an average. But in the present position of the agricultural interest there is little prospect of its being unduly pressed upon the market. On the whole we have every confidence in the maintenance at least of present rates; and, although further disasters may demand a continuance of the present salutary caution, we have strong grounds for anticipating a steady and healthy course of trade for the ensuing year.

AUSTRALIAN.—The arrivals came in early this season, and, the stocks being nearly exhausted, caused the earlier public sales to go off satisfactorily both here and in London. But the subsequent sales were seriously affected by the pressure in the money market and the inability of the trade to take off the excessive quantities offered at the London sales, which has led to a depreciation of fully 25 per cent. on the prices of the same period last year. The very heavy expense attendant on the cultivation of wool in these colonies under the present system is matter for serious consideration; and without recourse is had to Coolie or other cheap free labour, we look upon the future prospects of these colonies as most discouraging. This is sufficient in some measure to account for the indifferent condition of these wools, and, so far from expecting an improvement, we fear it is rather likely to be the reverse. The condition of the last clip as a whole was worse than we have noticed for some years, being both badly washed and the wools generally very burry. Many of the more celebrated flocks were got up with the usual care and good management, but these formed the exception. It has long been matter of surprise, that while the imports into Liverpool from nearly every quarter were regularly increasing, the receipts from the Australian colonies continue so insignificant, for which there can be no other reason assigned than that the trade has been more looked after by London houses. But it is becoming every year more apparent that the stability of the trade must greatly depend upon the imports being more equally divided between the two markets. This has been shown at most of the sales in London during the season, where it has been found impossible to dispose of the large quantity brought forward without withdrawing a large portion; and it has been no uncommon practice for parties there to send down wools to this market.

CAPE OF GOOD HOPE.—We have not noticed any improvement in the getting up of these wools, and the same complaint still exists as to packing and irregularity of the classification: the result has, consequently, been exceedingly unsatisfactory, and the depreciation greater than on any other description.

GERMAN.—The increased consumption of this class of wool, in Germany and Belgium, gave an animated turn to the fairs this season. Larger quantities than usual were taken for native consumption at decidedly advanced rates, which have since been tolerably well maintained. The import to this country has fallen off, being much interfered with by the extreme depression in colonial wools and the general disorganization of trade. We notice the extensive production of this description. The States of the Zollverein now possess 21,961,551 sheep, which, at a calculation of 22lbs. to 10 sheep, gives 48,500,000lbs. of wool. In addition to which the growth of the Austrian States is nearly 70 millions of pounds.

SPANISH.—This article has been in very limited request for the last eighteen months, and prices almost nominal. The present low quotations will, no doubt, tend to discourage importations entirely. At no former period were they known so low.

PORTUGAL.—Mountain wools have alone been in moderate demand, at fair prices. Other kinds have been almost entirely neglected, and the sales have been at extremely depressed rates.

UNITED STATES.—Owing to the flourishing state of trade on the other side, these wools have commanded higher prices than our market would afford; and the former shipments having resulted so unsatisfactorily, there has been no inducement to repeat them. This does not, however, alter our views with regard to the future: we believe that, eventually, this will be one of the main sources from whence we may expect supplies, as there is no country where wool can be produced at so cheap a rate, or where the increase in growth is so rapid.

PERUVIAN AND ALPACA.—Sheep's wool has been in very little demand. Best qualities alone have commanded attention, and at fair prices, while all other kinds have only been saleable at forced rates. *Alpaca*: The receipts have been fully equal in extent to previous years, and we are happy to add that there has been no falling off in consumption (almost confined to the home trade), while the fluctuations in price have been much less than in former years.

BUENOS AYRES.—Here we have to notice a considerable increase, and taking into account the great weight of the bales generally, the total weight of wools of all kinds imported here last year is greater than on any former occasion. We wish it was in our power to report any improvement in these descriptions. They are still so infested with burs and irregular in quality as to render them of very precarious sale; still they have gone off much better than might have been expected, and those who have met the market freely have, in nearly all cases, done best.

EAST INDIA.—The receipts are still on the increase, especially at this port. It is gratifying to notice that this description continues in high repute for general purposes. In most cases they are packed with more fairness than any other kinds, and are, consequently, purchased by the trade with the fullest confidence. Occasionally, however, we notice instances of country damage, which is difficult to detect when the package is perfect. This should be guarded against to prevent reclamations.

RUSSIA.—The arrivals have been very small, and confined chiefly to Donskoi, for which there has been very little demand either for combing or short kinds. Prices have undergone little change, having previously suffered a greater decline than any other description.

MEDITERRANEAN.—Notwithstanding the discouraging prospect of our market for most of these descriptions, the receipts have been to an average extent, but attended with loss to the importer. *Egyptian* has generally commanded a ready sale. There seems every disposition on the other side to follow out the suggestions given them, so as to render these wools more acceptable to our consumers, which, if properly acted upon, will lead to a great improvement in this description, attended, at the same time, with considerable saving in expense.

MOGADOR.—The receipts have fallen off considerably; still the stock is to an average extent, and comprises a good assortment. Owing to the reduced prices, the trade are turning more attention to them, and stocks are likely to be soon materially reduced.

ENGLISH, SCOTCH, and IRISH present few features to notice beyond what we have alluded to in our general remarks.

HUGHES & RONALD, Wool Brokers.

THE REGIONS OF OUR USEFUL PLANTS.

The geographical extention of each plant is described as its *region* or *province*, the most important of which may be briefly described as follows:

1. *The region of lichens and moss* reaches northward from 70 degrees N. lat., corresponding to the height of 8000 feet in the Swiss Alps; the whole of this tract furnishes but few useful plants except the reindeer moss.

2. *The region of pines birches* lies between 68 degrees to 70 degrees N. lat. When the firs exist in this latitude they are often very stunted. In Norway the birch will thrive as far north as 70 degrees, and in Siberia the larch as far as 68 degrees. In the Alps the highest range of forest trees is about 6500 feet, at which height the Siberian fir will thrive.

3. *The region of cereals*; in Sweden, common rye is sown as far north as 68 degrees; in Switzerland none of our cereals are cultivated higher than 4500 feet, at which height we have also the cherry. Winter wheat reaches to 64 degrees, and is succeeded by bere and lucern. In the Alps we find the apple and pear, along with rye, at the height of 3500 feet. In Norway at 60 degrees we have the oak, and at 61 degrees the apple tree.

4. *The region of vines* stretches from 52 degrees to 27 degrees N. lat.—from Silesia to Cyprus. In south latitude the vine flourishes at the Cape of Good Hope.

5. *The region of tropical fruits.* From 44 deg. N. lat. commence the olive, orange, rice, &c.; almonds and chestnuts are sparingly cultivated a little further north than those named.

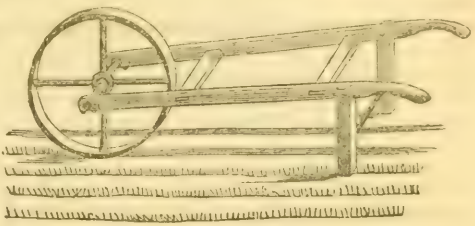
The further we advance south towards the equator, so much the more varied and numerous the families of plants become; yet the temperate zone is proportionately the richest in valuable species Amongst our cultivated and useful wild plants, none can equal in importance the cereals, and especially the wheat, which is freely cultivated over the whole continent of Europe. Nearly equal in importance is the rice plant, which is followed by the Indian wheat, potato, and tobacco. It is indeed remarkable that these last-named plants are peculiar to the torrid zone, and yet by cultivation and attention they have been completely acclimated over great part of Europe.

One peculiarity of the British Isles, which consists in presenting no extremely high mountain, joined to their small extent in latitude, prevents much variety in our plants. In the northern part of England wheat will not generally ripen at more than 700 feet above the sea; at that height and a little more, oats succeed exceedingly well. There is little if any of the surface of the British Isles which are geographically unfit for the growth of the hardiest species of forest trees. C. E. D.

ON THE BENEFIT DERIVED FROM PRESSING THE YOUNG WHEAT PLANT.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

Sir,—It is well known to all occupiers of fen lands, or of soils naturally loose and light in their texture, that much benefit is derived from pressing the young wheat plants as early in the spring as the season will admit, and the land sufficiently consolidated to bear the horses without injury to the crop. A heavy roller is used by some: Crosskill's clod crusher is highly beneficial for this purpose. Treading with sheep is also an effectual way of fastening the roots. But on the very loose soil of the fens in Cambridgeshire the wheat is frequently trodden by gangs of men, women, and children, each treading along the drills; and very frequently from want of weight in the young, and sliding the feet forward (to cover more space) by the old, the work is often done very ineffectually. To remedy this defect I have adopted a cheap and very simple implement, and from the result of three years' experience have found it a very beneficial one—it is the skeleton of a barrow, with cast-iron wheel two feet six inches' diameter, and three inches broad on the sole, weighing seven stone—together with the axle 18 inches long, small brasses to run in, and the wood work of the barrow, between 9 and 10 stone. Any common farm labourer can readily barrow an acre per day. The price given is 2s. per acre; last year, from the advanced price of bread I gave 2s. 6d. The great utility of this simple implement was fully proved last spring, after the hurricane that swept over the fens in the month of April, by which many hundred acres of grain were nearly annihilated, the storm having blown the moor and loose matter from the roots of the young plants. Some wheat on my farm in the parish of Tid St. Giles actually received benefit, by the wind levelling the ribs left between the drills into the hollow spaces made by the barrow, thereby moulding up the plants, which improved in luxuriance directly afterwards.



The model for the wheel is left at Mr. Swansborough's Iron Foundry Wisbech, for the use of the public.

I am, Sir, Yours Respectfully,
John Peck.

Parson Drove, Jan. 19th 1848.

KUHLMAN'S EXPERIMENTS ON AMMONIACAL MANURES.

In explanation and in continuation of Kuhlman's experiments, we subjoin the following table, showing the value of various substances, in ammonia. Not that this is the sole criterion of value in a manure, but as these experiments have shown the value of ammonia, the table is interesting as showing the quantity of the various substances which are required to replace 100 parts of farm-yard manure by supplying as much ammonia as it will.—(The table is extracted from a much larger one by Payen and Boussingault, in "*Comptes rendus àl' Academie des Sciences.*")

Substances.	Prop. weight of the substances which contain as much ammonia as 100 parts of farm-yard manure.	Substances.	Prop. weight of the substances which contain as much ammonia as 100 parts of farm-yard manure.
Farm-yard manure	100·0	Marl	78·1
Pea straw	22.3	Dry flesh	3·06
Wheat straw	166·06	Blood	13·3
Rye straw	235·2	Feathers	2·6
Oat straw	142·85	Horn parings	2·78
Barley straw	173·9	Fresh bones	7·54
Fresh beet-root leaves	80·0	Charcoal from the refineries	37·7
Potato stalk	72·72	Animalized carbon	36·69
Root of clover	24·8	Excrements of sheep	36·0
Linseed cake	7·69	Excrements of pig	63·0
Liquid farm-yard manure	67·7	Peruvian guano	7·88
Excrements of cow	125·0	Ichaboe guano	10·14
Urine of cow	90·9	Richardson's prepared bone manure	11·23
Excrements of horse	72·7		
Urine of horse	15·3		

METEOROLOGICAL DIARY—1847-8.

Barometer.			Thermometer.			Wind and State.		Atmosphere.		
Day.	9 a. m. in. cts.	10 p.m. in. cts.	Min.	Max.	9 p.m.	Direction.	Force.	9 a. m.	2 p. m.	9 p. m.
Dec. 22	29.69	30.—	32	34	33	N. East	calm	cloudy	cloudy	cloudy
23	30.—	29.79	31	37	35	N.E., S. by E.	variable	fine	sun	cloudy
24	29.88	30.10	36	38	36	N. East	gentle	haze	haze	haze
25	30.20	30.20	35	39	38	N. East	gentle	haze	haze	haze
26	30.23	30.23	35	36	33	E. by North	brisk	cloudy	cloudy	cloudy
27	30.28	30.28	31	35	33	N.byE., byW.	gentle	cloudy	cloudy	cloudy
28	30.28	30.28	32	33	33	N. East	gentle	haze	haze	haze
29	30.19	29.93	30	35	35	S. East	variable	cloudy	cloudy	cloudy
30	29.83	29.93	34	36	34	S., N. East	variable	cloudy	cloudy	cloudy
31	29.93	29.90	34	35	35	E. by South	gentle	haze	haze	haze
Jan. 1	29.90	29.90	32	39	33	S. by East	gentle	fine	fine	cloudy
2	29.84	29.94	34	46	42	South	lively	fine	sun	fine
3	29.94	30.—	42	48	46	S. by East	gentle	fine	cloudy	fine
4	30.04	30.—	42	51	39	South	gentle	fine	sun	fine
5	29.93	29.80	39	44	37	South West	lively	cloudy	cloudy	cloudy
6	29.87	29.97	32	36	33	N. West	gentle	fine	sun	fine
7	29.72	29.62	32	38	34	S. W., N. W.	lively	cloudy	cloudy	fine
8	29.66	29.78	34	38	38	Northerly	gentle	cloudy	cloudy	cloudy
9	30.07	30.20	30	38	32	North by E.	brisk	cloudy	cloudy	cloudy
10	30.27	30.33	30	34	32	North by E.	lively	cloudy	cloudy	cloudy
11	30.40	30.50	30	34	34	North E.	gentle	cloudy	cloudy	cloudy
12	30.50	30.37	32	38	37	W.-Northerly	gentle	fine	cloudy	cloudy
13	30.48	30.47	36	43	40	Northerly	lively	cloudy	cloudy	cloudy
14	30.30	30.13	38	40	38	North E.	calm	fog	fog	cloudy
15	30.—	30.08	36	40	33	North by E	gentle	fine	sun	cloudy
16	30.06	30.—	29	38	33	North W.	gentle	fine	sun	fine
17	29.78	29.48	32	40	36	South West	brisk	cloudy	cloudy	cloudy
18	29.50	29.50	31	39	33	W., S. E.	lively	cloudy	sun	fine
19	29.49	29.50	32	39	32	East by S.	gentle	cloudy	sun	cloudy
20	29.86	29.97	29	33	36	E.byN., N. E.	gentle	cloudy	cloudy	fine
21	30.07	30.17	29	32	31	North E.	gentle	cloudy	cloudy	cloudy

ESTIMATED AVERAGES OF JANUARY.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.77	28.890	52	11	36

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
38.258	33.26	35.759

Weather and Phenomena.

(Rain is indicated by the letter R.)

Dec. 22: Gloomy. 23: Sunny till the evening. Having said this, it may suffice to observe that it forms the only exception to a total absence of sun. Rain occurred on the 24th, 25th, 28th (with sleet), and 29th; weather cold, cheerless, and on the verge of frost.

Lunations.—Moon, last quarter, 29th, 1h. 48 m. afternoon.

Jan., 1848, 1 to 4 inclusive: Warm and sunny; a little rain on the fourth, and more in the night. 5: Windy and cloudy evening. 6: Beautiful. 7: Close rain for hours. 8 to 12: Fog; totally overcast, though the barometer was so high. 13: Fog and some rain; slight frost; days much warmer to the 15th, with fog and more rain. 15: Sunny. 16: Frost; a most lovely day, and a glorious sunset: but then cirrus clouds, and a lunar halo formed; an Aurora, of rich crimson tint, at 10 p. m. 17: Change; streaky clouds; many showers. 18: bright day; two halos—one pale, inclosing the moon and Jupiter; the second coloured—close to the moon. 19, 20, and 21: Very gloomy; some snow, and very chilling air.

Lunations.—New moon, 6th, 12h. 8m. noon. First quarter, 13th, 11h. 47m. = 13m. before noon. Full, 20th, 5m. afternoon.

Referring to Agriculture, we of East Surrey can report only favourably of the wheats and of the workable condition of the land. Of turnips we see none, excepting we look to *kohl rabi*, or cabbage turnip: that for spring is beautiful; the early breadths have been fed off.

J. Towers.

CALENDAR OF HORTICULTURE.—FEBRUARY.

RETROSPECT.—Just at the date when the last calendar was sent to press, the winterly weather of December set in—that is to say, on the 21st morning the thermometer marked 32 degs., the freezing point; this was the day of the full moon. Our meteorological diary will prove that not an hour of sunshine on any one day was observed; that the atmosphere was consistently gloomy, sometimes replete with haze; and the temperature low, but with only one slight frost early on the 27th; and scarcely any rain but on the 25th and 30th.

Many writers tell us of rain in abundance, but we of Surrey must register *observed* facts, and I for one can say that I never observed the ground in field or garden to be in a more healthy condition, or more favourable for common operations.

January, till the close of the third week, has been finer, much more sunny, and sufficiently keen to retard vegetation, but never to such a degree severe as to harden the land to the depth of two inches. Broccoli of very fine quality has been cut. Cabbages of August sowings are hearting. Savoys are remarkably good and large. Our market gardens are stocked to the utmost with all the *brassicas* of the season, and celery is beautifully fine.

If *potatoes* be dear, it is a consequence of reduced crop; for as to *disease*, whatever may be said of *local* affection, *we* cannot certify the truth of such statements. Here, the finest samples are to be observed in greengrocers' shops and in the wholesale venders' stores. Our own produce is excellent, and in the very few that have received injury, the cause may be ascribed to diseased tubers. Caution, therefore, is indicated in keeping the seed stock, and in the mode of planting. An atmospheric cause may, and perhaps will, recur; but who could think of abandoning the most *peculiarly* valuable *amylaceous* esculent that our islands have ever possessed? The rain that has hitherto fallen far exceeds that of the whole month of January, 1847, wherein the Chiswick table gives about 1 inch 31-100th parts; nothing, however, has yet fallen to compensate for the extraordinary drought of the by-gone year!

OPERATIONS IN THE VEGETABLE DEPARTMENT.

Presuming that the weather and land will be favourable, we may *sow in the first*, and again in the *third week*, long-pod, green or white Windsor, and Sandwich *beans*, three or four inches deep and as far apart, in rows thirty inches asunder; the ground ought to be mellow, and a rather *strong loam*, that was ridge-digged in autumn, and now made firm *under* the seed, and trodden *above* it.

Peas.—The little dwarf Victoria, a new pea, that rises scarcely a foot high, is a charming variety; it was very dear in 1845—I believe 5s. or 6s. a quart. I first saw it in a friend's garden, last June, and was told that the seed had been dotted in the drills nearly a regular inch asunder. Any of the early sorts may be sown twice, and will be nearly sure to prosper, provided the soil be in rich heart by having been deeply digged and incorporated with rotted dung early in the preceding autumn, to the extent employed by dahlia-growers, or in the best-made celery trenches. At this season seeds sown at regular distances will be most productive, always guarding against mice, by chopped furze, in the three-inch-deep drills, by "figure of 4" traps," and above all by watchful garden-cats.

Dig deeply, or trench eighteen inches deep all the vacant ground, manuring liberally, as a preparatory step; but avoid manure for early

Potatoes.—These are the *ash-leaved*, *walnut-leaved*, and *frame*. Soot, however—a bushel at least to a pole of ground—a gallon of salt, and a barrow of screened old mortar, well incorporated, can do no mischief (the work would have been preferable in October, the ground being laid up in ridges). Plant the tubers entire, in rows two feet apart, five inches deep, six inches asunder, either in open drills, or by a dibble furnished with a cross-piece to regulate the depth.

Sow cabbage seed, to succeed the young, forward plants and coleworts; and at the *end* of the month Scotch kale, borecoles, Brussel-sprouts, and winter-greens, parsley, horn-corrot, lettuce, parsnip, radish, round-spinnage, &c. Plant out young cabbage from the nursery-beds, chives, garlic and shallots, potato-onions, and the tiny ripe onions of last year, which may produce very large bulbs this summer, if the ground be deeply dug, and manured with soot and pure *guano*.

HARDY FRUITS.

Prune the gooseberry and currant bushes so soon as the buds swell; fork up the soils, and mulch the surface with three inches of short dung, sprinkled with about a small handful of guano to each plant; the rain will effect the rest.

Raspberry-trees are to be pruned back behind the bud where the canes take a bend, always retaining only four to six strong rods. Cut back to the lowest bud above ground all the weak shoots;

fork out the straggling offsets; fork the surface of the earth a couple of inches deep, then mulch it with rich, short, half-decayed manure.

Prune and regulate the wall stone-fruit trees, leaving a regular supply of bearing wood.

The *spur-bearing* trees, as espaliers or low dwarfs, are so pruned as to retrench the fruitful shoots, keeping the spurs of very moderate length with two or three blossom-buds "near home" on the mother branches.

The American blight, or *woolly aphis*, is a fearful pest; it takes up its residence in knots and hollow places of the roots as well as on the stem, and causes these excrescencies to enlarge by further, erosions of the bark. These must be pared away above and under ground, and then the wounds should be washed with *pyroligneous* acid, diluted to the strength of common beer vinegar. George Lindley applies a wash prepared with a gallon of quick-lime, 4 ounces of flour of sulphur, and half the quantity (2 oz.) of lamp-black—or, in its place, coal-soot—to be mixed with so much boiling water as will produce a thick paint.

The same mixture might, perhaps, be good in cases of canker, after a complete removal of the diseased wood and bark. I have cured many a cankered branch by rigid paring to the sound wood, and securely covering the wound with a bandage of linen cloth. Whatever be the exciting cause of canker, the wounds may be healed by thus promoting the advance of new and healthy bark.

If the blossoms of tender wall-trees open, or become very forward, through mild weather, let the branches be carefully interlaced with *fern leaves*, which may afford a light and yet effectual covering till the fruit be set.

Look over the stores, in order to remove decaying apples or pears.

Begin to prepare deep hotbeds, composed of strong, lively dung and tree-leaves, for cucumber and early melon plants; the size of the frames must regulate that of the beds. The linings around brick forcing-pits must be maintained in heat by fresh-fermenting materials of the same nature. Good straw-hurdles laid over the manure form an excellent defence from snow, cold rains, and searching winds.

The Flower Garden, &c.,

Must be kept in neat order by sweeping and rolling lawns and gravel-walks, the removal of leaves, &c.

The *evergreens* of all kinds must be cleared of snow that may lodge among them prior to the sunshine, which, if powerful, will rarely fail to scald the foliage. As to *raising* annuals, we repeat the often-given precept, to sow in pots or boxes under cover of a frame, rather than trust one seed to the open ground in a season so changeable as that of February. The cold frames and pits devoted to hard-wooded and semi-hardy plants must have plenty of air in drying and fine weather. *Roses* can be kept in fine health in brick-pits, and be excited by gentle linings to early bloom, provided, always, that the *aphides* be warded off by *timely* and *pre*cautionary tobacco fumigations.

Greenhouse and Conservatory.

As the day has now (Feb. 1) increased in length, so as to give 9h. 6m. of sunlight, and which will amount to 10h. 46m. by the close of the month, much less artificial assistance will by day be required, unless the atmosphere prove very cold and gloomy. The admission of dry air during every favourable opportunity is of the utmost consequence; but the grand question recurs, "How is that air to be admitted? There is at all times danger in a current; the wind ought not to rush through open sashes in front, and pass out through traps or openings in the back wall. It therefore appears desirable that channels from beneath, communicating with the open air—one at each end, and two or more in the front-wall, level with the floor—ought to admit the air from without, which would thus obviate the forcible current among the foliage, that is dreaded. The heat by *day* need not exceed 50 degrees, and 42 degrees at night is quite ample for the present; and this temperature will ensure the interflow of a portion of the cool air through the channels or air drains. Those also should be provided with plugs or flaps, to be used as the judgment of the gardener shall direct. I mean to embrace an early opportunity to describe at some length *a house which I inspected*, and have *subsequently planned*, that comprises every requisite for the introduction and diffusion of cool and warm air to and through houses of every description.

Plant-houses, stoves, and pineries will require the different degrees of temperature, governed by the increasement of light, so often alluded to in many preceding calendars.

In this month *strawberries in pots* may be introduced, according to the several periods when fruit shall be required for the table.

Vinery.

The commencement of the month is very suitable to the excitement of the second early crop. It should be begun at 50 degrees, and gradually pass through 55, 60, to 70 and 75 degrees as the maximum by day, and allowing a diminution of from 5 to 10 degrees by night. Every vine ought to be planted within the house, so as to ensure an approach to equal temperature around every inch of the stem. A moist or dry atmosphere is of com-

paratively trifling moment. Mr. Williams, of Pitmaston, keeps his grapery so dry that the glasses of spectacles worn by visitors entering the house from the cold air, have not been rendered misty by condensed vapour! But all and every mode of management will fail unless the root-bed be prepared with the best turfy loam, kept open by grit, lime-rubbish, crushed-bones, and the like; and protected by at least a foot-layer of dry and warm litter laid over the bed early, and kept dry by boards, tarpauling, or sound straw-hurdles.

21st day, a little snow; the weather just frosty; fine. J. T.

Croydon.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR JANUARY.

Notwithstanding the weather during the first fortnight of this month was unusually mild, the time of year considered, the accounts which have reached us from our numerous agricultural correspondents respecting the appearance of the winter wheats are very satisfactory. The sudden change, however, which took place in the temperature about the 17th has, we conceive, acted somewhat prejudicially to those in low and damp situations, as the plants became frozen and liable to injury. It would be idle for us to indulge in any speculation as to the effect the present state of things may have upon this year's acreble yield, it being sufficient for our purpose to know that the growers generally entertain no serious apprehensions for the future in that particular. During the continuance of wet, most field-labours, particularly the carting of manure, were much retarded; hence, to give employment to those who must otherwise have been idle, the flail and thrashing machine were brought into active operation, and very large supplies of grain were prepared for the various markets; but the high temperature rendered most of the samples greatly out of condition, and produced a deterioration in value.

Large quantities of Indian corn, meal, and rye-flour have been taken chiefly for feeding purposes; and we have good grounds for believing that those articles have become much in favour with the graziers, although we entertain very great doubts whether they possess the same fattening properties for beasts as oil-cake or linseed, given in a ground state.

The early lambing season has progressed very well, more particularly in Dorsetshire, Hampshire, and Sussex. The number of falls has been a full average one, and the losses comparatively trifling. A few lambs have already appeared in Smithfield and elsewhere in very good condition.

The observations contained in our last month's report on the subject of the supply of potatoes are being verified. Although the disease is not very prevalent, the actual quantity produced last year was certainly small. From Scotland, the North of England, as well as from the Channel Islands, the receipts during the whole of the month have been small; the consequence is that prices have advanced nearly 20s. per ton—the best York reds having produced not less than 150s. per ton, with every prospect of a further rise. What effect the deficiency in the crop will have upon the corn trade remains to be seen.

Depastured as well as stall-fed beasts and sheep h ve fared remarkably well. The supply of food has been very abundant. In all parts, an immense quantity of hay is still on hand, and the prices have ruled very low. So far as our judgment carries us, there is very little prospect of any improvement in them for some time hence.

Owing to the severity of the weather on the continent, the imports of live stock from abroad have been on a very limited scale; but both beasts and sheep have exhibited a marked improvement in quality, without, however, being fit for our first-rate butchers.

Throughout Scotland the demand for most kinds of corn has been in a very sluggish state, and prices have ruled somewhat easier. The stock markets have been firm, at higher figures.

In Ireland, the long-complained-of distress and misery amongst the great mass of the people appear to have been severer than was the case last year. Corn has sold at moderate prices; and, as yet, the shipments of grain to England have fallen considerably short of many previous years.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Although several fluctuations have taken place in the quotations of fat stock in Smithfield, as well as in the large provincial cattle markets, the general demand must be considered steady. In the early part of the month the prices of beef and mutton suffered a decline of from 2d. to, in some instances, 4d. per 8lbs.; but towards its close they advanced to about the level noticed at the end of December. On a comparison of seasons, the sup-

plies brought forward have been fair average ones; but, as has been the case for some considerable time past, their quality has proved by no means prime. Beyond this mere epitome of the demand and value, there is very little scope for observation; hence, we have to refer our readers to the following statistical details in support of the points just raised:—

SMITHFIELD SUPPLIES FOR JAN., 1848.

	Head.
Beasts	15,589
Cows	480
Sheep	91,880
Calves	770
Pigs	2,435

CORRESPONDING PERIODS.

	Jan. 1845.	Jan. 1846.	Jan. 1847.
Beasts	13,802	16,420	14,893
Sheep	112,690	87,500	94,680
Calves	783	800	842
Pigs	2,704	2,513	2,250

PRICES IN SMITHFIELD FOR JAN. 1848.

Per 8lbs. to sink the offals.

	s. d.	s. d.
Beef, from	3 4 to	5 0
Mutton	3 8 ..	5 4
Veal	4 4 ..	5 6
Pork	3 8 ..	5 2

CORRESPONDING PERIODS.

	Jan. 1845.		Jan. 1846.		Jan. 1847.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Beef, from	2 8	to 4 2	2 6	to 4 4	2 8	to 4 6
Mutton	2 10	4 4	3 10	5 4	3 8	5 2
Veal	3 8	4 10	4 8	5 10	4 0	5 0
Pork	3 0	4 6	3 10	5 2	3 8	5 0

The bullock droves have been principally derived as under during the month just concluded:—

	Head.
Northern districts	4,150
Eastern ditto	2,200
Midland and western ditto	2,000
Other parts of England	2,900
Scotland	790

As we have before observed, the arrivals of foreign stock have been exceedingly small. Those for London have been as under:

	Head.
Beasts	720
Sheep	4,608
Lambs	47
Calves	110
Total for London	5,485

The whole of the above, with the exception of a few calves from Belgium, and 200 oxen from Portugal, have come to hand from Holland. At the outports very few head have been landed.

Newgate and Leadenhall markets have been well supplied with both town and country killed meat; yet a large business has been doing, at mostly steady prices. Beef has sold at from 3s. 2d. to 4s. 4d.; mutton, 3s. 4d. to 4s. 6d.; veal, 4s. 4d. to 5s. 4d.; and pork, 3s. 8d. to 5s. 2d. per 8lbs. by the carcass.

HANTS.

Since our last monthly report, the weather has been unseasonably mild; during the last four weeks not more than forty-eight hours' slight frost, and but once snow, viz., on the 17th inst., and then not to the depth of half an inch; so that vegetation has scarcely been at all retarded, or if it has, not sufficiently so as to deprive the young growing wheats of that rich and luxurious green so peculiarly manifest this winter. Some old farmers are crying out for a good depth of snow; no doubt such would greatly benefit the growing crops, as also the grass-fields, meadows, and the remaining turnips, protecting such from cutting winds and biting frosts, which may yet be expected. The general assertion is, that there has but seldom been seen crops so promising and so healthy in appearance as the present young wheats, winter oats, beans, rye, and tares. The wet weather has prevented the clearing of farm-yards of months' accumulated dung-heaps, reserved for carting on the land during the dry frosts of winter, when ploughing is thereby retarded. This year, at present, such opportunity has not occurred; but as yet it is not too late to have much of such weather. The almost daily rains have prevented farmers refilling their barns from the out-door ricks and stacks; consequently, fine dry samples of wheat have become scarce, and kept their prices higher than was anticipated; the best white and red selling for the last month at most of the markets in this county at from £14 to £15 per load of five quarters, or from 56s. to 60s. per qr. The rick-yards, generally, are still filled to overflow; showing the superabundant produce of last harvest. Along that part of the county where the soil is rich and deep, from Stockbridge, Amport, Monxton, the Clatfords, Wherwell, Whitchurch, Overton, and on to Basingstoke, and from thence to Odiham, Farnham, and Winchfield, up to the borders of Surrey and Berks, the crops of last year's wheat were exceedingly good. Very few of those farmers who are industrious, and who manage their land properly, had less than nine sacks per acre, many from ten to twelve sacks per do. Even on the light lands around Andover, taking the hilly and chalky districts up to that station, across to Alton, Alresford, and Winchester, even where the soil is scarcely six inches deep, excellent crops were grown. The same may be said of barley and oats. Beans, peas, and tares, as also the latter clovers left for seed, were deficient crops—scarcely one-fourth of an average yield. Everywhere in this county the land appears forward for receiving the spring seeds, if we except the important part of manuring the same. The hop gardens have not as yet been meddled with. In some districts the autumn planting of potatoes on warm borders and

dry districts has been adopted. The Hampshire breeders of famed southdown sheep are beginning to prepare for one of their most important seasons of the year—that of lambing. In almost every district are to be seen the hurdles fixed, the sheltering coops, the warm, thickly-spread straw litters, with stores of green and dry food placed ready to nurture and support the ewes with their increasing offspring; also, the anxious and experienced shepherd, with his faithful brute companion—his trusty dog—his moveable temporary dwelling near, to partly shelter and enable him to attend at all hours to the flock entrusted to his care. Already some have many fine lambs of the Dorset and Somerset breed; others, down flocks, are bringing forth fine lambs. As yet the increase has been satisfactory. We hear but few complaints of the late disease among the sheep; the graziers appear to have learnt a useful lesson, as now they do not suffer their ewes to get too fat before their time of parturition, as were too frequently the case some years past. We cannot pass over this monthly report without noticing the disparity in the amount of wages given in this county to the poor, hardy "sons of toil" in some villages where the farmers are said to be the most wealthy, and occupying much of their own land. They are the most unfeeling and oppressive to the poor around them, giving such wages that a man with a wife and family cannot even buy sufficient bread with; leaving not a fraction for every other necessary human beings are expected to have. Enter their humble dwellings; there are to be seen the haggard, broken-hearted parents, and their almost naked and half-famished children; no clothing but what they have on their backs; a bed of straw, or chaff only, with little or no covering: no firing, unless from what wood they are driven to steal; never tasting meat, or any other food but dry bread, for months together—their only drink, water. The divided pittance of the father's earnings in many villages not exceeding 9d. per head per week, or about 1s. 4d. per day for 5 human beings to subsist upon. Reversing this awful picture, even within one mile are to be found farmers of humanity and kindness. These feel for those under them; not only give from 2s. to 4s. per week more wages, but allow other privileges, which the high and thoughtless farmers never think of. There is nothing allegorical in this statement, but plain and simple truth. The names could have been added, but *that* is thought better to refrain from adding at *present*. Hoping this unvarnished tale of misery will have the effect desired, of inducing the thoughtless and gay to follow the *Divine* injunction, viz., feeding the hungry, clothing the naked, and administering assistance to the afflicted and distressed.—Jan. 20.

SOMERSETSHIRE.

There not being that progression this season in the fruits of the land, &c., in our report we are now confined to the sales of stock, the produce of wheat, barley, and bean ricks. To begin with the wheat, which has now undergone to a large extent the test of thrashing, there seems an increasing testimony to a deficiency of yield in number of bushels, and independently of the very damp condition it has come in light; and the weight per bushel (and consequently the produce per bushel of flour) is decidedly deficient on an average. A good deal of the new crop has been brought to market, and gone into consumption at the present time, as is usual at this season. The supplies from the farmers are large, and as we anticipated in our last report, the prices have gone down at this period; but from the very large consumption of bread-stuffs going on, we are rather disposed to think they will not come down so low as we then thought by 2s. per qr., and think it quite likely the depression will be more than recovered before our next report. Barley does not turn out very full in berry, but the grinding qualities are dry, and have commanded relatively higher prices than the malting ones; in quantity this crop sustains the expectations formed of it, but not quite in quality. Beans are now very plentiful on offer, and the prices have receded; 5s. 3d. per 65lbs. best ticks, and 5s. large ones, being now the current price, and the quantity offering greater than the demand; still the yield is much complained of, and it is very likely the shortness will be more felt than at present. Of boiling peas there has been a large supply, and prime white are to be bought at 6s. 6d., and coloured ones 5s. 9d. to 6s.; there was, no doubt, a good crop of them. There are more oats on sale than last year; our growth is now very much confined to black ones, fine potato oats being seldom met with; price 20s. to 24s. per qr. Flour has been in good demand, from 41s. to 43s. per sack—at present 40s. to 41s. is the price per 280lbs. Potatoes have kept up in price, the quality being superior to last year; they are now used by those who can afford to give 1s. per 20lbs. for them; there are a great many kept back for seed, and a much larger quantity will be put in than last year. From the appearance of our markets and fairs an evident scarcity of *good* beef and mutton, and the second qualities are not so plenty; 11s. per score has been given for the best fat oxen; 6½d. to 7d. per lb. for mutton; fat pigs have fluctuated from 9s. to 10s.—at present about 9s. 6d. per 20lbs. There is more inquiry for cheese, without much amendment in price or increased supply; from 52s. to 60s. are about our prices for best per cwt. There is very little doing in wool—prices almost nominal. Poor sheep have been rather a dull sale, and prices declining. Not many lambs yet. Our stock of hay has been much favoured hitherto by the season, and the stock has done better out of doors, the land not being so wet as is usual at this season, and without severe frost. On the whole the wheat plant is looking well, but backward. Winter beans are also very promising at present. There is certainly much less suffering amongst the labourers, and yet, compared with last year, there are *more* in the union houses; the influx to them has been increasing annually as well as our poor-rates. The new system shows its bad effects here. If returns were ordered, showing the class of persons seeking relief in them, we believe it would be found that a large portion are vicious and depraved females with their illegitimate children, who seek the union-house as a place of refuge in the winter; and those whose po-

verty is not marked by an abandonment of character, to whom it is a hapless misfortune, too often, through the examples thus afforded them, sink into a degradation from which, we have known it to be the case, when the strictness of the law has been evaded, they have been rescued, and not only have they relieved the parish of a burden, but have become steady and valuable domestics. In this county already money is about to be spent to enlarge the houses to perpetuate these evils, and to add to the greatly increased rates.—Jan. 21.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

BANBURY FAIR has been smaller than usual. Amongst the nag horses there were but few entitled to a high price, and the sale of such as were offered was dull, although the assemblage of dealers was about equal to that of former years. The cart horses exhibited on Wednesday were considered to be of better average quality than the nags. At this fair it has been customary with some of the bacon-curers to make a show of fat pigs, and this year Mr. J. Flowers produced some of extraordinary size and excellent quality. He had a fine fat pig, bred and fed by Mr. Thomas Prickett, of Bloxham Grove Mill, weighing 34 score; an extraordinary fat pig, bred and fed by Mr. John Austin, of Bloxham Grove Mill, weighing 18 score; a superior fat pig, fed by himself, weighing 23 score; a fine fat pig bred and fed by Mr. George Deer, of Bodicote, weighing 13 score; a superior small fat bacon pig, bred and fed by Mr. John Wady, of Warkworth, weighing 4 score; also two very fine Tonquin porkers, fed by Mr. Joseph Scarsbrook, weighing 5 score each. Mr. Jas. Beale slaughtered an extraordinary animal, weighing 33 score, fed by Mr. Gibbard, of Chacombe Hill.

BEDALE FORTNIGHT FAIR. — The show of cattle was rather thinner than usual; fat beasts met with ready sale at about last fair's prices; cows and holding cattle were not much enquired after, and less prices were given. Sheep were all well sold up at trifling advance on last fortnight's rates. Beef, 6s. 6d. to 7s. 6d. per st.; Mutton, 6d to 7d. per lb.

CUPAR NEW-YEAR'S MARKET.—There were a great number of good cattle, which sold readily at high prices. Mr. Melville, Skelpie, sold five queys at £15 10s., to a flesher in Kirkaldy. Mr. Reid, Cruivie, sold a very fine bull of the Teeswater breed, for upwards of £27. Mr. Bogie of Balas sold a lot of excellent cattle for upwards of £20. Mr. Millie, Balgarvie, sold five fine cattle for upwards of £19 a-head. Mr. Bogie, Barneil, sold four fine cattle for £14 a-head. Mr. Wilson, Roodie, sold six superior heifers to Mr. Wallace, Cupar, for nearly £15 a-head. Mr. Henderson, Cairns Mill, sold three fine queys for upwards of £12 a-head. Mr. Gibb, Dairsie, had a lot of excellent cattle in the market. Mr. Galloway, Straiton, sold two fine queys for £27. Mr. Dingwall, Ramornie, sold two fine stots for about £34.

DRIFFIELD FORTNIGHT MARKET.—We had a good supply of stock, most of which was sold. Beef, 7s. to 7s. 6d per stone; mutton, 6½d. to 7d. per lb.

GISBURNE FAIR.—We had a fair quantity of fat stock, but not a large number of butchers, which caused a dull sale, and prices were rather lower than last market. We had a good supply of present calving cows, which were bad to sell, and rather lower in price. A good deal of lean short-horns, which were looked after at very good prices.

HELSTON FAIR.—There was a tolerable supply of fat cattle, which realized about 63s. per cwt. Lean cattle fetched from 40s. to 45s. per cwt., but very few were sold during the day.

LEEDS FORTNIGHT FAIR. — We had a small supply of both beasts and sheep. Beasts, 300; good ones sold at 6d., inferior 5d. to 5½d. per lb. Sheep, 3000; readily bought up at 6½d. to 7d. per lb. The market was rather heavy, but all sold.

MELTON MOWBRAY FAIR was well attended by both sellers and buyers, and there was a good show of all kinds of cattle, which met with a brisk demand at rather high prices.

NOTTINGHAM FAIR was much better attended than the preceding ones. Inferior horses were numerous, and fetched tolerably good prices, but good horses were very scarce. There was a large supply of store cattle, which sold exceedingly well; the quality, however, being so very varied as to preclude the possibility of giving the prices.

ROCHDALE FORTNIGHT FAIR was brisk, and many both drapes and calving cows were disposed of at fully as high prices as they were a fortnight ago. There is every appearance that the Rochdale fortnight cattle fairs will be better attended than most of the fairs in the county.

SALISBURY CHEESE, WOOL, AND SKIN MARKET.—The cheese trade was exceedingly dull; the very low prices of last week scarcely attainable. Several woolstaplers were on the market-hill willing to purchase Down and other wools of the graziers present; yet those now appear indifferent about selling; having so long waited the change of price, they still hope for a further advance. Prices offered, from 7d. to 11½d. per lb. Best Down skins were 2s. 9d. to 3s. each; long wools, 3s. to 3s. 3d.; poor skins, 1s. 6d. to 2s.; calf skins were sold at from 2s. 6d. to 4s. 6d. each; ox hides at 1¼d. to 1¾d. per lb.; horse hides at from 4s. to 5s. each. Butchers' rough fat at 2s. 6d. to 2s. 8d. per st.

WORCESTER FAIR.—The attendance of buyers was large, but the quantity of stock moderate. All that were fat were sold at 6½d. to 7d. A large number of barrens were brought, but many were returned unsold, in consequence of high prices. Of mutton the show was small; all sold at from 7d. to 7½d. Pork fetched 10s. per score. There was a bad show of horses; but few sold, and with a tendency to lower prices.

YORK FORTNIGHT FAIR. We had a short supply of fat beasts, the better sorts of which sold readily at about 7s. 6d.; middling kinds, 6s. 6d. to 7s. per stone; the market was well attended with buyers. A short supply of fat sheep was soon sold at from 7d. to 7½d. per lb. A small number of lean beasts met with dull sale; in-calvers sold readily.

HEREFORDSHIRE CATTLE.—At the sale by Mr. T Cooke, at the Sheriff's Farm, Lyonshall, of the stock descended from the herd of the late Thomas Jefferies, Esq., the property of Mr. James Corbett, the celebrated bull Gaylad was purchased by H. Higgins, Esq., (Brinsop) for £142; Gipsy Queen and her bull-calf by Gaylad, were purchased by J. Walker, jun., Esq., (Holmer), for £70; Brunette, a weaned calf by Gaylad, was purchased by Mr. Pitt, for £30; Woodman, a two-year-old bull by Forester, was purchased by John Moore, Esq., for £88; Early Bird, a yearling bull by Forester, by — Pitt, Esq., for £56; Robin Hood, a

yearling bull by Forester, by — Davis, Esq., for £52. In short, the whole of this choice stock realized high values.—*Hereford Journal.*

WHITE CARROTS *v.* SWEDE TURNIPS.—A gentleman at Great Maplestead has this year grown, upon three acres of very poor land, the enormous quantity of four thousand bushels of white carrots; the land, as before observed, was very poor, so much so that it was not thought worth cultivating; it was allowed to seed itself with grass and other seeds, so as to form a meadow, but the stock rejected it; it was two or three years ago broken up, and last year sown with white carrots, and the produce was as above stated. Five beasts were selected from the yard and tied up, two of the fattest and the best were fed with Swedes, the other three were fed with the carrots. It soon became very evident that those fed with carrots were going on the fastest, and, from their present appearance, are quite a month forwarder than those fed with turnips, notwithstanding the turnip-fed ones were the best when tied up.—Essex Standard.

READING FARMERS' CLUB.—At the first general meeting of the members of this club, held at the George Inn, Dec. 18th, 1847, W. H. Stone, Esq., High Sheriff, in the chair, the proposed rules were adopted, and the following officers appointed—President: The most noble the Marquis of Downshire. Vice-Presidents: Robert Allfrey, Esq., George E. Beauchamp, Esq., Colonel Blagrave, Sir J. Conroy, Bart., Richard Fellowes, Esq., John Bligh Monck, Esq., Robert Palmer, Esq., M.P., Henry P. Powys, Esq., Wm. Stephens, Esq, William H. Stone, Esq, Mortimer G. Thoyts, Esq., J. J. Wheble, Esq. Committee: Mr. William Champion, Mr. Josiah Fuller, Mr. Frederick Kidgell, Mr. Iremonger, Mr. Robert Lovegrove, Mr. John Leach, Mr. Charles Pocock, Mr. Parsons, Mr. John Righton, Mr. John Shackel, Mr. Turnbull, Mr. Young. Treasurer: George Shackel, Esq. Honorary Secretaries: Mr. Alex. Dickson, Mr. Martin Sutton. A library, consisting of the most recent and approved works of popular authors on agriculture and rural economy, is already in the course of formation, which, together with a commodious reading-room, supplied with all the leading agricultural periodicals, will shortly be opened for the use of members. The books taken out on one Saturday to be returned on the next. Monthly meetings will also be held for lectures or discussions on practical subjects, the first of which will take place on Saturday, the 22nd of January, on which occasion, J. C. Nesbit, Esq., F.G.S., has consented to give the opening lecture.

HARLESTON FARMERS' CLUB, Dec. 15.—Subject: The Game Laws.—Resolution: The evils attending the excessive preservation of game, as regards the owners, occupiers, and tillers of the soil, as well as the public in general, are now so well known and admitted, that the Club feels it can offer nothing new upon that point. It is disposed, therefore, rather to turn its attention to a remedy for the present system, and with this view suggests that it is unjust in principle to raise a revenue from the permission to destroy property which cannot be identified, and thinks, therefore, that no license should be required for that purpose; but considering all wild animals as the property of the owner of the soil on which they are fed or found, would recommend such a trespass law as would secure to those who maintained them the privilege of destroying them. The above old established Club held its annual Dinner Meeting on the 22nd of December, when a very agreeable evening was passed under the presidency (in the absence of the chairman, Mr. Gedney) of the secretary, Mr. R. B. Harvey; the only alloy being the resignation by these two gentlemen of the offices they have so long held. Mr. Harvey stated that his inability to give sufficient time to the affairs of the Club was the sole cause of his resignation, and expressed a hope that some younger member would now relieve him of its duties. He congratulated the Club on its successful position at the termination of this the tenth year of its existence, believing that during its course it had been instrumental in originating opinions both in the practice and principles of agriculture which by general consent were now admitted as sound; and he trusted that as it had been one of the first in the field, it might be the last to expire, so long as there were practices to improve or principles to advance or defend. These sentiments were cordially responded to by succeeding speakers, and after a vote of thanks had been passed to Mr. Gedney for his long continued and highly valued services in the chair, and to Mr. Harvey for those of the secretaryship, the Club proceeded to the appointment of members to fill the vacant offices, selecting for the former George Durrant, Esq., of South Elenham Hall, and for the latter, Mr. Francis Dix, of Dickleburgh.

HOP STATISTICS FOR THE NORTH CLAY DISTRICT.—From a circular issued by Mr. John Hudson, hop-grower, Retford, we observe that the following is duty paid for the respective years:—

Year.	No. of Acres.	Old Duty. £.	Weight per Acre.
1820	694	1285	3 1 21
1821	691	1327	3 2 8
1822	672	3162	8 3 0
1823	671	7	0 0 2
1824	670	1331	3 2 26
1825	709	1341	3 2 5
1826	715	3570	9 1 12
1827	715	191	0 2 0
1828	711	2428	6 0 10
1829	702	276	0 2 26
1830	704	1540	4 0 11
1831	712	2710	7 0 14
1832	714	1234	3 0 27
1833	720	1126	2 3 20
1834	726	3561	0 0 22
1835	734	220	0 2 9
1836	757	2209	5 1 24
1837	759	3336	8 0 26
1838	749	571	1 1 19
1839	590	2006	6 1 14
1840	567	57	0 0 21
1841	604	1159	3 2 10
1842	584	1724	5 2 3
1843	545	1126	3 3 14
1844	535	766	2 2 20
1845	517	413	1 3 14
1846	465	2481	1 3 14
1847		214	

SYMPATHETIC SHEEP.—Two ewes belonging to Mr. Matthias Bradley, of Barnard Castle, lambed last April within one hour of each other, each having two lambs; and in December last the same two ewes again lambed within an hour of each other, and again had two lambs each.—*Gateshead Observer.*

REVIEW OF THE CORN TRADE

DURING THE MONTH OF JANUARY.

The almost unseasonable mildness by which the winter has been characterized—for up to the middle of January we had scarcely any frost—caused some uneasiness to be felt at one period respecting the autumn sown wheat, it being feared that it might become prematurely luxuriant, or what is technically called "winter proud." Apprehension on this subject has, however, been allayed by a fortnight's pretty sharp frost, accompanied in many parts of the kingdom by more or less snow, and there is consequently at present no reasonable ground for fear. Hitherto we have heard of no misgivings respecting the future; on the contrary, the opinion appears to be, as far as any judgment can be formed at this early period, that the prospects for the next crop are decidedly favourable. The sowing was certainly completed under auspicious circumstances, and the plant gained great strength before the frost set in. If the weather had continued as mild as it had previously been, it might have been attended by danger; but a wholesome check has lately been given to vegetation, the benefit of which will hereafter be apparent. The frost is likely, besides, to act beneficially on the land intended for spring tillage, by rendering it more friable when the plough shall have been brought into operation. But the greatest immediate advantage likely to result from the change in the weather is the improvement it is calculated to work in the condition of the corn of last year's growth. The long continuance of a humid atmosphere throughout December and the first half of January had acted so injuriously on the quality of the grain in stack, that farmers were till lately very unwilling to thrash; but now that this drawback is removed we may expect better supplies; indeed the deliveries from the growers have within the last week or two increased. About the close of last month the impression was very general that the value of wheat was about to undergo a material rise; we, however, distinctly dissented from this view in our number for January, and what has since occurred has strengthened our conviction that prices will not advance unless something should unhappily hereafter occur to lead to apprehension in respect to the next crop.

The stocks of old foreign wheat in the country have not been reduced so much during the winter as was generally expected would have been the case—it is true that there is not any very large quantity at the different outports, and that what remains in London would soon be consumed if we had a large country demand, but the chance of such being experienced is now materially lessened, as in proportion as the wheat of our own growth improves in condition, a less quantity of foreign for mixing will be required. At the same time there is reason to believe that our farmers hold fully as great, if not a larger, proportion of their last year's growth than is usual at this period; hence, there is little prospect of anything like scarcity being felt for many months to come. Long before that time we shall have fresh importations from abroad; for though prices are just now too high as well on the continent of Europe as in America, as compared with our own, to make consignments to Great Britain a profitable adventure, we have not the slightest doubt that quotations will hereafter be regulated abroad by our apparent necessities; and if the value of the article does not rise here, it must come down in the northern markets of Europe at least, and also, we think, in America. The duty which is to be resumed on the 1st of March is not so high as to afford anything like protection, and will not, we think, tend in any great degree to lessen importations. Under these circumstances, we should be misleading our agricultural friends if we were to lead them to calculate on higher rates than those now current; indeed, our impression is that the tendency will be the other way, provided, as before intimated, all goes on well with the crop on the ground.

Great stress was laid, by parties favourable to a rise, on the probable wants of Ireland; and it is quite true that a good deal of inferior wheat and Indian corn has been shipped from Liverpool and elsewhere to the sister isle; latterly, however, the demand from thence has fallen off, and rather important supplies of Irish wheat and flour have been received at Liverpool, which is an important circumstance in reference to the future range of prices. It is also pretty certain that if America should not be in a position to furnish us with much wheat, she will certainly be enabled to send a large supply of Indian corn—an article more likely to be required by Ireland than any of a more costly kind; hence, we do not place much weight in the value of wheat dependent on a supposed drain of bread-stuffs on Irish account.

Thus far our remarks may be said to refer almost wholly to the future; we shall now proceed to no-

tice what has occurred in the trade since our last. During the first half of the month there was very little increase in the supplies of wheat from the farmers, and though the advices from the large consuming towns were not by any means encouraging, prices were tolerably well supported at the principal markets in the agricultural districts. The very indifferent order in which the greater part came to hand in consequence of the very damp soft weather was, however, a great drawback, and business was at no time active. Latterly there has been some improvement in the condition, but, at the same time, the deliveries have so far increased as rather to exceed the demand, and prices are at present 4s. to 5s. per qr. lower than they were at the close of December in most of the country markets. The extreme caution with which buyers have acted may be attributed in a great measure to the still prevailing want of confidence resulting from the disastrous failures of last year, and we are inclined to think that it will require a lapse of time before this is entirely got over. Credit has certainly been most severely shaken, and the immense losses incurred have taken so much capital out of the trade that the operations are likely for a considerable time to be on a more retail scale than we have for years been accustomed to.

The arrivals of wheat coastwise into London did not show much increase in the early part of the month, nor was much brought forward at Mark-lane by land-carriage samples from the neighbouring counties until within the last fortnight; still the tendency of prices has from the beginning been downwards. On Monday, the 3rd of January, only the very finest qualities supported their previous value, all other sorts being quoted 1s. per qr. lower. On that day week affairs remained in nearly the same state, the only difference being increased difficulty in inducing the millers to take more than absolutely necessary for the supply of their immediate wants. From this time we may date an increase in the receipts and a decline in prices. On the 17th of January the fall amounted to 2s. to 3s. per qr., and throughout the succeeding week business was exceedingly languid; no further decline was, however, submitted to until the 24th, when factors again gave way 1s. to 2s. per qr., notwithstanding an improvement in the condition of the samples. Though the demand has not, as already intimated, been lively, still there has been no accumulation of stocks at the port of London, all the English wheat brought forward having gone into consumption; and we believe that our millers have throughout acted strictly on the hand-to-mouth system, having now as little on hand as before the supplies increased. The fact is, that bread is, and has for some time been, one of the cheapest articles of food, and that its use among the middle and poorer classes has been very extensive. Of foreign wheat the receipts have been larger than might have been expected, considering that the northern ports of Europe were mostly closed by ice previous to Christmas. The greater part of what has come to hand has been from remote ports, and has consisted of inferior quality; but we have also received a few cargoes from Rostock and neighbouring places, the growth of last year, and very fine. The inquiry for old foreign wheat has throughout the month been slow. The country demand has been much less extensive than had been calculated on, and local buyers have mostly acted with great circumspection. Holders have nevertheless displayed considerable firmness, and prices have not given way in the same proportion as has the value of English: indeed, it would have been perfectly useless to have pressed sales, buyers having shown a decided determination not to be tempted to take more than necessary. Some of the low and unsweet qualities have been offered at very moderate terms, and quotations range very wide, say from 35s. up to 58s. per qr. Some of the shipments from Black Sea ports, as also inferior sorts of St. Petersburg wheat, might easily have been bought at from 35s. to 45s. per qr., according to condition, &c.; whilst good to fine Polish Odessa has been held at from 42s. to 48s.; common sorts of Lower Baltic red at 45s. to 50s.; and superior, such as the new Rostock above alluded to, at 56s. to 58s. per qr. Really fine Danzig has become very scarce; and the finest high-mixed would still, we think, command 58s. to 60s. per qr. in small quantities.

The nominal top quotation of town-manufactured flour has remained stationary throughout the month at 48s. per sack; nor do we think that this figure is even now too high, compared with the value of such wheat as is required to make a really good sack of flour. Norfolk and other country-made flour was scarce in the early part of January, and brought rates proportionate to those obtained for the best London marks; later, however, the receipts per railway have increased, and 42s. per sack may be considered as an extreme quotation for households. We have had no arrivals of importance from America, and the quantity of fine remaining in warehouse being reduced into a very narrow compass, full terms have been demanded for the best brands; prices have, however, given way about 1s. per brl. for the finest sorts, being at present worth no more than 28s., whilst doubtful samples may be had at rates varying from 22s. to 26s. per brl.

The farmers thrashed barley more freely than wheat during the mild wet weather, the former

article being less susceptible of injury from a humid atmosphere than the latter. The London market was consequently well supplied in the early part of the month, and the maltsters were enabled to purchase very good qualities at 31s. to 32s. per qr. Within the last week or two the receipts have been less plentiful, and the increased cold having induced the maltsters to work more extensively than they would probably have done if the weather had continued as warm as it was previously, prices have lately crept up 1s. to 2s. per qr. The common descriptions of barley have not participated in the improvement, and the value of such has remained very nearly stationary. The arrivals of this grain from abroad have not been large, and grinding qualities are not nearly so abundant as they were in the early part of the winter; indeed, really good heavy samples have become rather scarce, and have commanded relatively high rates. The low sorts from the Black Sea, &c., may, however, still be bought at 21s. to 22s. per qr.

Quotations of malt have varied but little since the close of December; a trifling decline did occur at one period, but it was speedily recovered, and prices are now very nearly the same as they were in the beginning of the month. Choice ware malt has lately brought 58s., and other sorts 48s. and upwards.

The arrivals of oats have been very small, and the quantity received has fallen short of the consumption of the metropolis; the principal dealers have consequently had to draw pretty largely on their stocks, and though the supplies coastwise and from Ireland have, during the last fortnight, rather increased, there are at present symptoms of a rise in prices. Hitherto the receipts from Ireland have fallen very far short of the quantity we have for years past been in the habit of obtaining from thence. This has, up to the present period, been comparatively little felt, owing to good supplies having, till nearly the close of the year, reached us weekly from the continent; latterly, however, the foreign arrivals have nearly ceased, and as shipments from the north of Europe can scarcely be expected to be resumed before March, we are not likely to receive any assistance from thence for about two months. It appears, therefore, tolerably certain that nothing but a materially-increased supply of Irish oats can prevent a rise in the price of this grain; still up to this time the dealers have manifested no disposition to buy more than just sufficient for their immediate wants, and the trade has been more firm than active, with only a slight upward movement in quotations. The quality of the new oats which have reached us from the sister isle has proved good, the weight of the finer sorts ranging from 40 to 43lbs. per bushel; for such the price has varied from 23s. to 25s.; new Scotch feed have sold 1s. to 2s. per qr. above those rates; and potato, 26s. to 28s. per qr. The foreign remaining on the market are generally of inferior quality, and in bad condition; really good Rigas have commanded 22s. to 23s., but there are other light sorts not worth more than from 17s. to 18s. per qr.

Beans of home growth have come forward less freely than was the case in December, still the supply has quite kept pace with the demand, and considering the improvement which the recent frost has worked in the condition of the article, prices are at present lower than they were at the close of the past year. Very fair new ticks have lately been sold at 34s. to 35s. per qr., and other sorts at corresponding terms. Old beans, having become very scarce, have borne a relatively much higher value; and handsome pigeon beans have commanded 55s. to 56s. per qr. Of foreign we have had moderate arrivals from time to time, principally Egyptian, the demand for which has been steady at 30s. to 32s. per qr.

The inquiry for boiling peas has been less active than is usually the case during the winter months, owing probably to the generally mild character of the weather; fine parcels of English having, however, lately become scarce, and a seed demand being shortly expected, quotations have rather tended upwards, the best sorts having been held at 44s. to 46s. per qr.; foreign have, on the other hand, been freely offered at 42s. per qr. Maple and grey peas were a good deal neglected in the early part of the month, and were then sold at 38s. to 40s.; last Monday, however, the former brought 42s. to 43s., and the latter 39s. to 40s. per qr., with rather a lively inquiry.

Spring tares have lately met with some attention. Of English only one or two small lots have been brought forward, which have sold at 6s. to 6s. 6d. per bushel. Foreign are rather plentiful, and not worth more than 40s. to 42s. per qr.

There is still a large quantity of Indian Corn in London: this article has been used to some extent for feeding purposes, but has gone into consumption very sparingly as human food in this country: the price at Mark Lane ranges from 25s. to 35s. per qr. At Liverpool there has lately been an inquiry for Ireland, where this article finds more favour than on this side of channel.

We have already said, in the commencement of this article, that prices of wheat have hitherto remained relatively higher abroad than in this country, and at the same time expressed a belief that this could not long continue to be the case. We shall now refer shortly to the position of the trade in the

different foreign markets, leaving it to our readers to draw their own conclusions.

Our American news is not of very late dates, the steam-boat which left there in the middle of the month not being quite due yet, but by the advices received by the previous packet we learned that a money crisis quite as severe as that through which we have lately passed was then being experienced in the United States, the rate of interest having risen to 10 and even 12 per cent. This great rise in the value of money had, however, up to that period (1st inst.) had less effect on the prices of produce than might have been expected, and at New York fine brands of Western Canal flour were still held at 6 to 6½ dollars per barrel. There can, however, be but little doubt that the value of all articles must ultimately feel the effect of the scarcity and high price of gold. Good stocks were held at the ports on the sea board, the inland navigation having remained open to an unusually late period, and allowed supplies to come down to the coast from the westward at a period when in ordinary seasons all communication by water is cut off. Under these circumstances we should not be surprised if the value of flour should recede on the other side of the Atlantic sufficiently to render shipments to Great Britain no very rash undertaking; and that large quantities of Indian Corn will in the spring and summer be received from thence we have not the slightest doubt.

From the north of Europe we are also likely to receive supplies of bread stuffs, more particularly wheat, that article being less extensively consumed than rye, &c.; and the crops of the former having, in 1847, yielded very plentifully, there will be a considerable surplus for export. The stocks in warehouse are, however, small all over the Baltic, the accumulated growth of previous seasons having been almost wholly exhausted by the immense shipments to England last spring and summer.

At Danzig only about 3,330 lasts—a little over 30,000 qrs.—remained on hand at the close of 1847; and at the lower ports stocks are equally unimportant; it is consequently clear that the deliveries from the growers must become much more liberal than they have yet been, before prices can be expected to fall materially in that quarter. We learn, however, by the most recent accounts, that the supplies from the farmers were decidedly on the increase, and that quotations had begun to give way. At Rostock, Stettin, and neighbouring ports, where, until recently, fine qualities of wheat were held at 45s. to 48s. per qr., prices have receded to 41s. to 44s. per qr., according to quality, and are likely, it would appear, to go still lower, if the inquiry for spring shipment should not improve.

At Danzig, prices were still comparatively high, nor are they likely to give way much there until the summer, when supplies begin to come down the Vistula.

At Hamburg, and other near ports, the wheat trade has been influenced by the late dull accounts from hence, and in the Mediterranean prices are likewise tending downwards; it is, therefore, in our opinion, by no means improbable that by the time the ice breaks up in the northern ports of Europe the value of wheat will have declined to a point rendering it profitable to consign to England, and our agricultural friends must be prepared to expect foreign competition.

CURRENCY PER IMPERIAL MEASURE.

JANUARY 22.

	Shillings per Quarter. NEW.		OLD.	
WHEAT, Essex and Kent, white	48 to	55	55 to	57
Ditto red	45	50	50	56
Norfolk and Suffolk	45	48	—	—
Lincolnshire and Yorkshire	—	—	48	52
RYE	32	35	—	—
BARLEY .. Essex, Kent, Norfolk, and Suffolk .. com. Malting	30	32	—	—
Distillers' & Grinding	27	30	—	—
Chevalier	31	33	—	—
MALT .. Essex, Norfolk and Suffolk	—	—	56	58
Kingston, Ware, and town made	—	—	58	60
OATS .. Norfolk, Cambridgeshire, Lincolnshire, and Yorkshire, feed	—	—	20	22
Ditto, Poland and potato	—	—	25	26
Northumb., Berwick, & Scotch potato	—	—	27	29
Ditto, feed	—	—	24	26
Devon & West Country, feed or black	—	—	17	20
Dundalk, Newry, and Belfast, potato	—	—	24	25
Ditto, feed	—	—	21	23
Limerick, Sligo, and Westport, potato	—	—	23	25
Ditto, feed	—	—	22	23
Cork, Waterford, Dublin, Youghal, and Clonmel, black	—	—	16	19
Ditto, white	—	—	18	21
Galway	—	—	13	15
BEANS .. Ticks	34	37	45	50
Harrow and small	38	42	45	55
PEAS .. Boiling	43	45	—	—
Hog and grey	40	43	—	—
FLOUR .. Town made (per sack of 280 lbs.)	—	—	43	48
Norfolk and Suffolk, household (do.)	—	—	37	41

FOREIGN GRAIN.

	Shillings per Quarter. FREE.
WHEAT .. Dantzic and Konigsberg, finest high mixed white	54 to 58
Ditto, good mixed	53 56
Ditto, red mixed	48 53
Stettin and Rostock	51 56
Danish	48 52
Hamburgh and Pomeranian	53 55
Black Sea (nominal) hard to soft	40 46
Riga, St. Petersburgh, and Liebau, soft	40 45
BARLEY .. Hamburgh, Dantzic, Konigsberg, and Riga	27 30
Ditto, Grinding	24 28
Danish, Mecklenberg, and Pomeranian	25 28
OATS .. Dutch, brew, & Poland, Friesland, & Groningen	24 26
Danish and Swedish	19 22
Russian	20 23
BEANS .. Tick	36 40
Small	42 45
Mediterranean	28 32
PEAS .. White boiling	40 42
TARES (none)	— —
FLOUR .. United States	24 28
Canadian	23 27
INDIAN CORN MEAL (per brl. of 196 lbs.)	14s. 6d. to 15s.
RYE FLOUR (per ton)	£6 10s. to £7

IMPERIAL AVERAGES.

For the last Six Weeks.

	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
Week Ending:	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Dec. 11, 1847..	51	11	30	5	22	4	31	0	42	7	47	7
Dec. 18, 1847..	52	2	30	7	21	7	34	4	41	6	48	2
Dec. 25, 1847..	53	0	31	3	21	3	31	1	40	6	44	5
Jan. 1, 1848..	53	11	31	8	20	7	29	11	39	10	44	10
Jan. 8, 1848..	53	10	31	7	20	11	31	4	40	8	46	0
Jan. 15, 1848..	53	5	30	6	21	0	29	2	39	1	46	4
Aggregate Average of the six weeks which regulates duty	53	1	31	0	21	3	31	2	40	8	46	3
Comparative Average same time last year......	63	10	45	0	27	4	45	7	46	2	50	0

No Duties are now to be levied on the importation of corn or flour until March 1st, 1848.

PRICES OF SEEDS.

January 22.

Cloverseed was held firmly, but there was not much doing in the article. Canaryseed sold slowly at late rates. Linseed and Rapeseed, as well as cakes of both sorts, quite as dear as last week. Foreign Tares were held at 40s. to 42s. per qr.; of English spring few have hitherto appeared, and those have commanded 6s. to 6s. 6d. per bush.

BRITISH SEEDS.

Linseed (per qr.).. sowing 56s. to 60s.; crushing 44s. to 48s.
Linseed Cakes (per 1,000 of 3 lbs. each) £13 10s. to £13 15s.
Trefoil (per cwt.)........................... 15s. to 21s.
Rapeseed, new (per last)..................... £28 to £31
Ditto Cake (per ton)....................... £5 15s. to £6
Mustard (per bushel) white.... 6s. to 9s.; brown, 8s. to 10s.
Canary (per qr.) .... 63s. to 65s.; fine, 66s. to 68s.
Cloverseed, red .... 38s. to 56s.; white, 46s. to 48s.
Tares, Spring, per bush..................... 6s. to 6s. 6d.

FOREIGN SEEDS, &c.

Linseed (per qr.) .. Baltic 44s. to 48s.; Odessa, 45s. to 50s.
Linseed Cake (per ton)....................... £9 to £10
Rape Cake (per ton) .... £5 to £5 10s.
Clover, red (duty 5s. per cwt.) per cwt. .... 35s. to 47s.
Ditto, white (duty 5s. per cwt.) per cwt......... 38s. to 50s.
Carraway (per cwt.) .... 35s. to 37s.; new, 37s. to 38s.
Coriander (per cwt.) .... 18s. to 21s.
Hempseed (per qr.)........................... 35s. to 38s.

HOP MARKET.

BOROUGH, Monday, Jan. 24.

Our market during the past week has been very firm for all descriptions of Hops, especially for coloured samples, which are becoming scarce. The following is the present currency:—

Mid. and East Kents .... 66s. to 112s.
Weald of Kents .... 60s. to 68s.
Sussex Pockets.............. 58s. to 66s.

Horton and Hart.

WORCESTER, (Saturday last.)—We have a good demand for all fine samples of 1846 Hops, at an advance this week of 2s. to 4s., the current price for that class being 66s. to 70s.; inferior qualities still continue dull, with no inquiry for them.

POTATO MARKET.

SOUTHWARK WATERSIDE, Jan. 24.

Since our last report it has been good weather for the consumption of potatoes, and there has been more activity among the buyers. The best samples of York Regents were eagerly sought after, at a further advanced price. Best samples from all parts were more in request, and an advance was realized; but all inferior qualities went off heavily at former quotations. The following are the present prices:—

	s.		s.		s.		s.
York Regents	150	to	160	Kent & Essex Shaws	100	to	140
Do. secondary......	130	to	140	Do. Kidneys	120	to	140
Scotch Buffs	115	to	120	Do. Blues	120	to	130
Do. Mixt. and Whites	110	to	—	Dutch White	90	to	100
Kent and Essex Regents	120	to	150	Wisbech Regents ..	110	to	140

BUTTER, CHEESE, BACON, AND HAMS.

Butter, per cwt.	s.	s.	Cheese, per cwt.	s.	s.
Dorset	108 to	112	Double Gloucester	60 to	64
Carlow........	94	98	Single	58	64
Sligo	86	88	Cheshire	56	70
Cork, 1st......	88	94	Derby	62	66
Waterford	88	89	American......	40	48
Limerick	86	90	Edam and Gouda	46	50
Foreign, prime			Bacon, new	64	—
Friesland....	106	—	Middle........	46	60
Kiel.........	94	102	Hams, Irish......	66	70
Fresh Butter, per doz.,			Westmoreland..	84	—
12s. 6d. to 15s. 0d.			York.	84	—

WOOL MARKETS.

BRITISH WOOL.

LEEDS, Jan. 21.—Sales have not varied materially during the present week. In prices we do not quote any alteration.

LIVERPOOL, Jan. 22.

Scotch.—There is a pretty fair demand for Laid Highland Wool at our quotations; white is more inquired for. The few transactions in Crossed and Cheviots scarcely support our quotations, except for the best sorts.

	s.	d.		s.	d.
Laid Highland Wool, per 24lbs	5	6	to	6	3
White Highland do	8	6		9	0
Laid Crossed do .. unwashed....	7	6		9	0
Do. do... washed	9	0		10	6
Do. Cheviot do... unwashed....	8	6		9	0
Do. do... washed	11	0		15	6
White do. do..................	18	0		20	0
Import for the week	137 bags.				
Previously this year	1047 „				

Foreign.—There has been rather more doing this week in most kinds of Wool; but as the imports, since the beginning of the year, have been considerable, buyers are buying on fully as good terms.

HIDE AND SKIN MARKETS.

			s.	d.		s.	d.	
Market Hides,	56 to	64lbs.......	0	1¾	to	0	2	per lb.
Do.	64	72lbs.	0	2		0	2½	„
Do.	72	80lbs.......	0	2¾		0	3	„
Do.	80	88lbs.......	0	3		0	3¼	„
Do.	88	96lbs.......	0	3		0	3¼	„
Do.	96	104lbs... ...	0	3¼		0	3½	„
Calf Skins			4	0		6	0	each.
Horse Hides			8	6		0	0	„
Polled sheep......................			3	6		4	8	„
Kents and Halfbreds...............			2	9		3	6	„
Downs............................			2	9		3	1	„

NOTICES TO CORRESPONDENTS.

"Poor Price."—We have received a communication for Poor Price, and shall be obliged if he will forward us his address.

A correspondent wishes to be informed of the address of Mr. William Taylor, from whom an article appeared in last November number of this magazine, on "The Cultivation of the Gold of Pleasure."

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THE FARMER'S MAGAZINE.

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No. 3.—Vol. XVII.] [Second Series.

PLATE I.

MERINO SHEEP.

The animals in this plate are decended from the last remnant of the flock of his late Majesty George III., which were purchased by Mr. Sturgeon, of the Hall, Grays, Essex, many years ago, and from which he has bred his present highly esteemed flock, with much attention and great expense.

The late Lord Western kept this breed of sheep for many years. Mr. Sturgeon has succeeded in producing a stock combining size, symmetry, and constitution—a quality of wool scarcely surpassed by our continental neighbours, whilst the weight of the fleece is nearly treble; it being no rare circumstance with him to clip 12lb. of well washed wool from the teg rams.

Although so long naturalized to this climate, they are a tender breed, enduring badly either wet seasons or severe weather. A characteristic of this breed is that the rams are horned and the ewes polled, with a remarkable tendency to throw out hoof—seemingly a provision of nature, to fit them for a migratory life; it is consequently necessary in this country to travel them occasionally on the road, to keep their hoofs down. Their faces are beautifully white, and the wool of a peculiarly silky fineness.

Mr. Sturgeon purchased, at the late Lord Western's sale, *all* the pure Merinos sold, and has now got a superior flock.

Though the importance of the English Merino, as a breed, may not be recognized, it is the description of sheep that almost exclusively supplies the wants of our colonists in Australia and the Cape of Good Hope, consequently affecting the staple export of these Colonies, and therefore of much importance. Fresh blood is found indispensable in the proper management of sheep in Australia; as, from the influence of climate, the wool is found not only to lose its length of staple, but the animals their size and constitution, which can only be restored by a cross from those brought from a colder climate, bearing a longer staple with the other necessary requisites of size and constitution—all which are to be found in the English Merino, as contradistinguished from the fine-woolled sheep of other countries.

PLATE II.

MIAMI; Winner of the Oaks, 1847.

Miami, bred by Mr. Isaac Sadler, of Stockbridge, in 1844, was got by Venison, out of Diversion, by Defence; her dam, Folly, by Middleton, out of Little Folly, by Highland Fling—Harriet, by Volunteer.

Venison, foaled in 1833, is by Partisan, out of Fawn, by Smolensko; her dam Jerboa, by Gohanna, out of Camilla, by Trentham. His wonderfully stout running at three years old was perhaps never equalled; while as a stallion he shows every promise of becoming the most fashionable horse in the market; Alarm, Red Deer, The Ugly Buck, Red Hart, and many other good runners, preceding the first and second for the Oaks of this year.

Diversion, bred by Mr. Sadler, in 1838, reads better in "The Stud Book" than in the "Calendar;" after a few very moderate performances she was taken out of work, and added to the celebrated Hampshire harem, throwing, as her first foal, Deer Chase, now in Mr. Greville's hands, in 1843, and an own sister, hight Miami, the following year.

Miami is a light bay, or bay roan filly, standing fifteen hands and an inch high, with a very handsome blood head and neck, good clean shoulders, excellent depth in the girth, rather long back and loins, good quarters, muscular thighs, and capital sound legs and feet. She is rather slight in the bone, and when in work trains light; but is altogether a very wiry, game-looking, little mare. She has no white, beyond a star on the forehead and a few grey hairs on the top of the tail.

Summary of Miami's Performances.—In 1846 she ran twice, and won once—The July Stakes, value clear, £850. In 1847 she ran six times, and won once—The Oaks, £1125. Total, £1975.

TENANT-RIGHT:

PRIZE ESSAY,

BY HENRY CORBET, SECRETARY OF THE LONDON FARMERS' CLUB.

(The Prize for this Essay was given by the Chairman of the Wenlock Farmers' Club.)*

"Reason is reason——
——And right is right."

[The author of the following pages feels that he owes no little of his success to the position he occupies. When it is remembered that the tenant-right claim, if not entirely originating with, has been mainly supported by, the proceedings of the London Farmers' Club, the advantage of being associated with the business of that institution is at once apparent. The effect of this connection has been, to induce the writer to give his arguments with more force and decision than he might, perhaps, have ventured to do on his own unsupported liability. As it is, there is not a case assumed, nor an opinion broached, but for which he could name the very highest authority and example. The avowal of assistance thus indirectly afforded must surely give greater weight to what follows—a labour of love—which, if thought in any way worthy of their acceptance, the author would dedicate to the members of the London Farmers' Club, from many of whom he has already experienced rather the kindness of friends than the mere courtesy due to a comparative stranger.—H. C.]

It is occasionally urged as an objection to the system on which legislative enactments are passed in this country, that few great measures are ever acceded to without the prologue of considerable popular agitation upon them. There is a more than respect for the judgment of the few, and a more than indifference to the opinion of the many, in the support of such an argument, that stamps it at once with a hypercritical, and we trust impracticable, character. Every subject, from that of the most palpable class interest, to those of a more extended nature, is sure to find opponents to do battle with the zeal of its advocates. Fact is met with counter-fact, plea for plea, assumed advantage by threatened inconvenience, and, in short, every effort made by the one party to retard the progress of what is advanced by the other. Attention is thus gradually and generally called to the point at issue. Agitation has at least this favourable feature, that it disseminates information, while at the same time it constitutes the people to judge on the cause whose merits are being so thoroughly dissected before them; and if, under such an ordeal, the question gathers as it goes, we may rest tolerably well assured of there being some heart in it, and some call for the consideration it may ask.

Agitation is perhaps the best, as of course the first, means to be adopted for insuring the recognition of tenant-right. The great obstruction, until very lately, had been the want of information as to its use and purpose. Advocates and opponents agreed alike on this head. The most strenuous and able arguments for its being received and persevered with—the most lucid and impartial statements of the good it must effect—the most conclusive examples of the good it *had* effected, where it had yet been tested—were how met? how answered? Not by any decided reason for refusing to acknowledge it—not by any plea of the disadvantage to some that would accompany its assumed recommendation to others—not by the least attempt to question or cavil with the examples offered in proof of its efficacy—not by all or any of these; no! but rather by a somewhat indifferent avowal of ignorance concerning its object, or of vague fear touching some indefinite consequence that might ensue from its application. The challenge for discussion upon it, the desire to hear any proper objection to the principle, the courted enquiry into the aims of its supporters, were too often received with a neglect, or cold pass word—yea or nay—that neither the importance nor the soundness of the subject could at any time merit, or can now happily suffer to continue. This question is one that does gather as it goes, and that must have that consideration and provision it petitions for.

In attending to any such petition for new enactment or proposed alteration in the present law and custom of the country, the first point to be discussed is, how this addition or revision comes to be required at all, or how we have contrived to go on so long without it? This caution is especially

* "For the best essay on the necessity of some legislative enactment to secure the tenant farmer the benefit of his improvments, and the great national advantage that would accrue therefrom."

called for in all new Acts having relation to landed property, the rights of which, it may be fairly assumed, can be less affected by the gradual changes we encounter than those of any other interest to which the legislature gives its protection. Now tenant-right, both in name, and the claim it makes for general use, is certainly of modern origin, and, as assuredly, open to any examination of this kind. Too many however—landlords particularly—have shown little inclination to bestow so much trouble upon the matter, but would appear to have condemned it at once, on the same principle the Dutch professor did Greek, viz. because he knew nothing about it. He ate without Greek, he drank without Greek, he got his so many hundreds a year without Greek, he lived all his life without Greek, he knew nothing about it, and he did not believe there was any good in it. So very frequently has been the answer of our English landlord. He has let his farms again and again without tenant-right, he has received his so much per annum in rents without tenant-right, he has eaten, drunk and slept without being ever before asked for tenant-right, he knows nothing about it, and he don't believe there is any good in it.

Here then comes the question—why should it be forced upon him now? What is tenant-right, and what change in the custom or the cultivation of the country has rendered, as is said, its adoption so absolutely necessary? If the farmers have gone on so long without it, what have they done latterly, or what will they do to require this new enactment?

In one word, they have *progressed*—in one sentence, *the tenant-right cry is the surest sign of a spirit of improvement and advancement in the pursuits of agriculture,* that has yet been afforded us. In the good old times, when every plan was devised for taking all out of the land and putting nothing into it—when men began with the most limited outlay and ended with the smallest profits—when they just lived on, to do as their fathers did before them, without the spirit, or perhaps we should say, the necessity we have for increasing the fruits of the earth to their uttermost production—in those days, with a want of skill, capital, and incentive, the call for tenant-right, the demand for compensation for unexhausted improvements the tenant had engaged on, must have been in the common run of cases idle and useless. The occupier could never claim for what he had never done, the landlord gain no great fame by declaring his readiness to pay for improvements that no one ever dreamt of effecting. For too long did this continue; for too long the want of knowledge or the want of competition kept down the latent energy that almost every Englishman has, and which almost every other class of our countrymen had exerted and advanced by. Improvement now, however, has been gradually taking place, and to their credit be it said, mainly through the exertions of the working farmers themselves. Spirit, science, capital, have all at last been brought to bear here, as they long had been in other arts and pursuits; and all with results that have only acted as inducements to proceed. The people, the proprietors, the government—all join in approval of this advance, as all see how necessary it is that increased production should, if possible, accompany increase of population.

The greatest encouragement, it is declared, should be given to those who employ their talent, labour, and means, in bringing this improvement about. In answer to all which flattering avowals, the achiever of this good—the tenant farmer—would go just a step further, and define that inducement to persevere which his fellows profess to be so ready to offer. The greatest encouragement then he asks is—his just right—that he should be put on the same footing as other men who live by their labour; viz., have legalized recognition of the capital he embarks, and a fair return for the improvement he effects.

In arguing for a general adoption of tenant-right, it may not be amiss in the first place to show how landlord and tenant are at present situated without it. The former would appear to have but one grand point to attend to—the rent of the holding; and that we know is secured to him, under the worst of circumstances, safely and surely enough. The tenant, on the other hand—we take the case of the majority—works from hour to hour, and from day to day, without security for a sixpence he may lay out; that is, without the right of claiming, or expecting anything beyond what the kindness of the agent or the liberality of the landlord may please to allow him. He goes with the drawn sword, suspended by the single hair, perpetually hanging over him—a thread that the word of a keeper, the malice of a steward, or the assumption of any unpalatable independence in act or thought may sever in a moment. Taking, moreover, his position in a peculiarly pounds, shillings, and pence point of view, how would the relative value of the farm influence any contemplated expulsion from it? Only look at it in a fair, common-sense light. An enterprising man takes a farm in poor condition—as most farms are taken—and begins at once to work it round. He drains, he manures, he marls, he refits the buildings, he new makes the fences, and so in the course of two or three years has put the ragged occupation he entered on in the way of producing something like that it is capable of. And what with his yearly tenancy may be the consequence? A London land-agent shall ride over the place, and confirm the increased value of the property by a

rise of twenty-five per cent. in the rent of it! or, should this be too barefaced, the really most advantageous thing that could occur to the owner would be to hear of his dashing, striving, but incautious tenant being swept, smuggled, or blown out of the country. Let him be but removed somehow or other, and then the Grange may be advertised for immediate possession, at a rental in accordance with the advantageous terms on which a new man would enter it!

Such a case is neither an improbable or impossible one; and while it is possible, no permanent or general improvement in agriculture can be ensured. The first and fullest sense of justice must declare against a system that will suffer caprice, petty misunderstanding, or even the more direct feeling of might not right, to wrong a man with an impunity that is heightened by an ingratitude; and if justice does so declare, a remedy should be found for the evil she complains of.

Such a remedy by its first and most apparent feature would be tenant-right; the alternative or preventive being security of tenure, which in other words implies taking by lease only. The lease indeed is often argued as the tenant-right itself, though as far as permanent improvement or *national advantage* goes, we think it cannot be alone sufficient. In fact it will be seen that the recognition of tenant-right must be quite as necessary—as far as these two features are concerned—with a lease as without one. To the tenant the lease gives one great boon—it assures him how far he can go, and what plan he must pursue. To a certain extent and for a certain time he *is* secured; beyond that, for the four or five last of his fourteen or twenty-one years he feels he cannot, in justice to himself, continue cultivating the land in the liberal and thorough manner he hitherto has; knowing there would be improvements in progress which the duration of his term would never allow him to have the benefit of. Thus, instead of every acre gradually reaching and remaining at the acmé of excellence, the want of one great principle brings all back again and again to a poor and exhausted state. Time and money are alike sacrificed by such a proceeding—time, in that required to bring the land on again as *de novo;* and money, from the well known fact that it requires twice or thrice as much capital to bring land into proper cultivation, as it does, when once arrived at, to keep it so. The tenant may make himself safe with such a guard as his lease, but no great *national advantage* can be enjoyed, no permanent improvement effected, while a man's own interest compels him to the unnatural and ungrateful task of forcing back his own business.

We have here taken, as fair premises, the manner in which land is now let; separating it into two different classes—with and without a lease. The former precluding any advance or employment of capital at all; the latter nullifying, or at least lessening in a very great degree, the improvement that may have been the result of any increased skill and expenditure. Without a lease, a good tenant is but an incentive for making a bad landlord; with a lease, and a lease only, a farm is brought to its best use with the long purposed plan of bringing it down again to its worst. The inference drawn from such a system can be only this—that it is imperfect, impolitic, unjust, and unprofitable to all concerned in seeing agriculture flourish, whether the people at large, the tillers of the soil, or the owners of it. The alternative is shewn as the evil is described; and we now come to the pith of the question, in considering how the application of this remedy would affect the three classes we have just mentioned—whether benefit to one would be injury to the others, or whether the grand effect we assume would be of equal interest and proportionate advantage to all three parties we urge to join in supporting it.

Let us first proceed to the case of the one said to be least inclined to the measure—the landlord—and endeavour to ascertain whether tenant-right would be landlord's wrong or not. In doing this we must look to the manner in which it would affect the owner's position in two different ways—the one touching the influence tenant-right would have on his property; the other, how it would act on his privileges.

In estimating the former we commence with this great fact, *that before the principle of tenant-right can be brought to bear, improvement in the property must have been accomplished.* If the tenant has wanted the energy or the capital, not only to increase the present production, but to lay the foundation for further benefit—if he has lacked skill and discretion in the proper use of his means, and so lavished them without the presence or promise of return—or if he has embarked in expensive plans, that a good system of cultivation did not absolutely require—if he has managed in any way like this, he has no claim to tenant-right. Before the landlord allows a halfpenny to his retiring tenant, he must be satisfied by a statement of facts and the award of valuers, that what he pays for is actually in his land, and will have to be again allowed to him, in rent or otherwise, by the next comer.

The give-and-take is, at any rate, equal so far; it, however, affords but little more than the first blush of the matter. Let us now go to the heart of the landlord's interest in the question, by seeing how his rents would rise or fall by the establish-

ment of tenant-right. According to the present custom, a tenant, if only duly, and we may add *fairly*, forewarned of his going, does all in his power to leave the land as low and exhausted as, without directly infringing on any rule or covenant, he possibly can. Let tenant-right have the sanction of the Legislature; let the good farmer work under its protection, and it would be his interest to farm well up to the day of his departure—for this very simple reason—Instead of, as in an unprotected state, gradually drawing in the use of his money, and staying the force of his ability, he would have confidence to make the most of every minute on every acre as long as he held it, knowing that just compensation would await him for what he left behind.

Now take the question of rent here. Ask any agent, or any working farmer, what difference is made in rent to a man entering on land in a good or in a bad state of cultivation? Hear how earnestly and how truly the incomer will, in the one case, plead of the time he will have to wait, and the sums he will have to find before he can count on the least return. Attend to this, and only mark the effect it must of course have on the estimate. In the other case the talk is all the other way. Here is the land in a condition fit to repay as readily as that of the oldest inhabitant on the estate; and if one hesitates at the price per annum, depend upon it there are plenty of others more than anxious to take it at almost any rate of rent a man of business could put upon it. Keep up the cultivation, and you keep up the rents. Lower the one, and there will be a *sequitur* in the other as inevitable as unprofitable. The sympathy in the well-doing of landlord and tenant has long been acknowledged; it must now be acted on. The time spent by a tenant in enriching at his entry, and in impoverishing at his exit, is so much time lost to himself, so much income lost to his landlord, and so much food and wealth lost to the country.

There is a feature arises here, that bears, perhaps, as much on the good feeling that should exist between the two parties, as the actual advantage to either. In letting, on the present plan of yearly tenancy, without any acknowledgment of tenant's-right to compensation, it is said that a good farmer will, after a few seasons' possession, frequently consent to a considerable advance on the rent he paid at first entering. A good farmer will generally, but a bad one seldom if ever, even if such a thing be asked of him, and for this reason—the one has shewn a cause for it, the other never attempted or never succeeded in finding one. To this increase, moreover, it will be well worth the while of the good tenant to submit, from the increased value and productiveness of the land to when he first took it. In a word, the landlord says, "I raise your rent because you have improved my property." See what an incentive this is to progression; mark how harsh and ungrateful it strikes on the ear; and yet nineteen men out of twenty, who put all their energies to the task of bringing neglected or purposely poorly farmed land to the best use, know and feel that such is the reward they will have. Good feeling can never be engendered by such a system as this; and no man, we are sure, however able to give the advanced rent, ever submitted to such a return for his good stewardship, with an atom of that heartiness and cheerfulness which is said, and which should ever characterise the feelings of the British yeoman towards his squire. A depression, too, of a man's full energy and industry must be more or less the consequence. "If I do," the farmer may say to himself, "make up my mind to this, or try that and get a turn by it, they will be down upon me directly; better keep on as I am." The spirit of enterprise is damped, and many an otherwise earnest son of the soil makes this an excuse, if he does not even consider it an absolute necessity, for half measures. Compare this with the case of him who takes land that is kept in its best condition by the action of tenant-right. He begins with his eyes open to every thing; he pays a rent to the full value of the land, and it depends solely on himself how much that rent shall pay him. No unexpected re-estimate sours the result of his labours; no surmised alteration lessens them. The good feeling that most contracting parties commence with is continued, because they commence on the fairest and plainest terms; and the landlord takes from the first the full rent his land is capable of yielding, without any of that inquisitorial over-looking or sharp practice which the English gentleman ought no more to countenance in others than be guilty of himself.

The benefit, then, the owner of the soil would derive from the establishment of tenant-right may be thus summed up:—It would, in the first place, cause far more capital to be brought into use on his property; the result of this accession of means would be an additional amount of labour in applying them. These, combined with a proportionate increase of skill and attention, would bring the land up to its full value and use, ensure its being kept so, and secure to the owner the best price for it. This is the direct view we may take, although there are many collateral advantages appertaining to those just named; as, for instance, the necessity for capital to commence with would certainly bring a superior class of applicants—men of substance, who could withstand the force of any sudden pressure, or work on through any tempo-

rary depression, without the long story and short supply that tenants of small or no capital of their own are so constantly forced to offer. Again, increase of labour would be accompanied by decrease of poor-rate; and rate *versus* rent, we all know, is one of the first allowances a landlord has to consider. In a word, tenant-right would materially add to the gross returns of the owner of the land, while it would as assuredly lessen those drawbacks property is at present encumbered with.

The effect on the landlord's privileges is in a great measure demonstrated while ascertaining his more substantial interest in the question. The right or security of return to the tenant for doing good, it has already been shown, would convey no power with it for making unnecessary alterations, or for indulging in, save at his own cost, any useless excesses. Any licence allowed the holder, or any stipulated for by the owner, could be agreed to, and acted on, precisely as such agreements are acceded to now—with this only difference, that, should any dispute arise, the tenant would meet his landlord on the equal grounds of justice, instead of being, as at present, too often thrown entirely on the other's mercy. The only privilege that the owner of the land could lose would be the inability to pay off presumed affront, or taking pique by little, if anything, less than direct outrage. It is not general, we are glad to say, but still there are examples, and late ones too, of "the notice" that has followed the assertion of independence, or the avowal of different opinions. Conceive the *hauteur* with which the agent is ordered to give "that man" what the law absolutely allows him, and nothing more. Conceive the injustice that becomes the consequence of and panders to the ill feeling; and picture the dependent and degraded condition of any one whose interest forces him to submit to, or rather to go in fear of, such a privilege—A power that reduces the yeoman to the standard of the serf, and one which, though no man would dare openly to claim, some still take the opportunity to exert. If tenant-right did or promised nothing more, this fact alone should warrant its adoption.

The case of the tenant may be much more briefly stated, if indeed it be not already given in what we have written. As situated at present, this the rule, the reverse to it the exception, the landlord has every protection lawfully allowed him; the tenant *none*. Every other profession and trade has security for the capital employed; the tenant-farmer *none*. Every other class finds in the law and custom of the country inducement to progress; the tenant-farmer *none*. He hopes for everything; he is sure of *nothing*. All his outlay, all his labour, all his energies, are expended solely on the faith of a good landlord—a goodness, the realization of which may have to submit to the perversion of an agent, may be endangered by the most trifling act, or entirely destroyed by political bias, death, sale, or other change of ownership. Any man who farms to the full extent of his means, on such a guarantee, proceeds in defiance of all those chances human life and nature are liable to. He is acting as rashly, although he may be loath to believe it, as he would be to go on without insuring his house and corn against fire, or his cattle against disease. He never, perhaps, had a fire on his premises yet, and hopes never to have one; but still, while such a thing might occur, he feels it would be braving Providence to go unprepared. He never had a quarrel, never had reason to doubt the justice or generosity of his landlord yet; but he might, still. Or, even not admitting that, the common fate must separate them sooner or later. And if his old landlord dies first, who shall insure him such another? Who shall answer for a continuance of that good understanding which existed so long between the two? Who shall guard him against the acts of the new heir—the need of the spendthrift, or the avarice of the miser? *Why* or *how* should the stranger have any consideration for him?

Is there no call for provision here?

Or take the other bearing of the case, and suppose the tenant to be the first to be called away, the labour of his hand and head left unfinished, the harvest of it afar off. Would that man feel, or say it plainly, would he *die* easier in knowing that the profit of this labour was secured to his children, or with the consciousness of the widow and her orphans being left to ask their own from the charity of others? A man may in his own day be fortunate enough never to feel the want of his right being so secured to him; but it is still no less his duty to his family, even more than to himself, to demand the recognition of it.

The similarity in these equally necessary forms of insurance against the possibility of loss may be illustrated in another point of view. With his capital all expended, all in the ground, but the return of it not yet due, the working farmer will often find himself in need of assistance. Can he, as contented to live at present, expect any? Could he, as a man of common sense, offer that—and all he has to offer, mind—as security to another, for which he has no security himself? To call in further capital to carry out what his alone was unequal to, he must comply with the terms a lender will be sure to make himself safe by. To one he advances money on a life income, that life being first insured; to another, he will do it on personal property, being, as a preliminary, well satisfied that the borrower's right to that property is insured.

The tradesman borrows on his stock in trade, or the debts on his books—debts which he can lawfully enforce the payment of. The farmer's debt, on the other hand—the sums he has credited to the soil—is but an optional one, and may only be paid out in case of the debtor being kind enough not to quarrel with and leave his creditor.

We once heard a tenant-at-will declare very knowingly that the system he farmed on was, "always to be prepared for a notice;" the only one, we must confess, that, in justice to himself, every tenant-at-will, and that is a large majority of the farmers of the kingdom, ought to adopt. Yet, could farming ever be efficiently practised on such a system? Is not the very nature of it such as to require time, and time only, to bring all its uses to perfection? And should there not, in a good state of cultivation, be always some future benefit to look to, beyond what is in the present actually gathered? Quick returns, or very heavy crops in short periods—that is, for a single season—must be always in the end injurious to the land, and of course equally so to the cultivator, should he continue, or to his successor, in case he should not.

As a maxim, *the business of the farm ought never to be hurried.* The rotation of crops, the manner in which one preludes the other, the length of time that improvement will last, and the gradual way in which a combination of these improvements works on to excellence—these, and many other well-known truths, all show the impolicy of from-hand-to-mouth measures. A tenant, to farm properly, should be brought to feel that the advantages, the foundation of which he is laying, are secured to him and his heirs for ever. With tenant-right, he would feel so; without it, we would counsel him, in the words of our west-country friend, to be "always prepared for a notice"—in plainer phrase, to go on from hand to mouth, making the worst of his land and the least of his labour, depriving himself of all the power money might back him with, or ability find him in, simply because he wanted the sense or the spirit to ask for his right, or his landlord the perception or justice to offer it him.

Beyond the interest himself and his family may have in the matter, a regard for his character as an honest man—one who would be true and just in all his dealings—should induce the tenant to enforce this right. The advice generally given to any one commencing life is, to remember that, in all he does, he cannot have the particulars too clearly or plainly drawn out. The whole business of the country is supposed to be conducted on this principle. The very law demands that it should be so. For instance, let any man who has been unfortunate appeal for relief to the bankruptcy or insolvent court; and the clearer his accounts, the fairer and more business-like the manner in which his different contracts have been made, the easier and more creditably will he pass. Surely the tenant-farmer ought to be no exception to this rule; surely he should be expected to be as provident in the contracts he makes, and as careful with the credit he obtains, as other men. None, in their different vocations, pay so much for the ground they live and work on as the farmer. None then, in the event of insolvency, offer, under any circumstances, so unequal a division of what they have left. He is ruined, he is gone; and the landlord comes in to seize three-fourths, four-fifths, or perhaps *all* of the effects for rent, while he quietly pockets, with this, the improvements in progress—improvements which, carried to an extent beyond his means, may have led to the tenant's distress. What a commissioner would call "culpable neglect on the insolvent's part," or a spectator term "most uneven-handed justice," here pays the debt of one creditor in full, whilst it gives him as a *bonus* property which palpably belongs to the others. We see from this how curiously, but how certainly, the interests of one class work on those of others. Men in different spheres, who have passed this over as the cry of an individual or party with whom they had no sympathy, would, with a little consideration, have found how directly the action of such a right might advance their own interests. The claim consequently becomes that of the nation, as the granting of it would tend generally to the *national advantage.*

In addition to its more fairly distributing the effects of any who might not prosper, tenant-right would tend much to decrease the actual failures we hear of amongst agriculturists. It has been observed, in considering the landlord's case, that the fact of a farm being left in a high state of cultivation, the absolute necessity for capital as incomings, would bring a superior class of tenantry—that is to say, would spoil the market of the many adventurers who swarm the country, ready to take farms anywhere and any how, but quite unable, from lack of means, to do justice to them. Now it is proverbial that men with nothing to lose will be apt to act more rashly and incautiously than those who have property of their own at stake; and it is equally evident that a man without any self-support to rely on would yield to adverse circumstances much sooner than such as have. The presence, in short, of this something to begin with would prevent tradesmen and others from being the sufferers they now are, from admitting occupancy as a sufficient guarantee,* would spare the landlord the pain

* In the other case, of course it would be.

of being so often forced to seize, and rid the more substantial man of an unwholesome competition which prudence generally renders him unequal to vie with.

In one synopsis, the tenant's right would be to secure to him not only his own capital, but to make the use of more available should he require it; to confirm his confidence in others, as theirs in him; to induce him, by the certainty of a proportionate return, to exert all his powers in bringing the land to its highest state of production; to cause him to turn to the best use all that good he has been entrusted with; to raise him to the rank of proper independence, and to advance him greatly in a social as well as in a moral point of view.

"To increase the demand for labour by enlarging the field of its application will necessarily lead to an increase of the means of living for the labouring classes. Of course profitable labour is here meant —labour that will yield a return to the employer, for labour that is profitless and altogether forced and artificial cannot be relied upon for affording permanent means of subsistence to the labourer. It is from the profits of labour that the fund for the payment of wages can be permanently obtained."

The above extract from Mr. Nicholls' able essay on the condition of the labourer points directly to the only practicable means for improving that condition. To increase the demand for labour you must increase or advance the cultivation of the land, ensuring moreover to the employer that *sine quâ non*—"a profitable return." The action of tenant-right would do all this; in a word, its advantage to the labourer would be in finding him more employment. We should occupy too much space, if not indeed it be too self-evident a fact to require further elucidation, to demonstrate how this advantage would arise. The basis of all prosperity is that every man may find a fair regular market for what he has to sell; the working-man can offer only his work, and the farmer who buys it must know from experience that nothing will pay him better than such a purchase. The more dealings, then, that are transacted between the two parties, the better for both; at the same time that their neighbours also will feel that benefit which, as has already been observed, one class is sure to derive from the well-doing of another. The labourer in the receipt of good and certain wages will be enabled to reach many little comforts he is otherwise denied, and with which it will be the business of tradesmen and manufacturers to supply him. In addition to this direct gain, the great body of the public would be relieved by the action of the same sound principle of many burdens they are at present encumbered with. Industrious pursuits would destroy the opportunity of, as the reward of those pursuits remove the incentive for, doing evil; poor's-rates, county rates, prosecution expenses, and other consequent attendances on idleness and want, would be sensibly decreased: in fact, these taxes on the people and their property would fall in precisely the same ratio as their condition improved, and both individually and *nationally* a great and lasting advantage be the result.

If the verdict be taken as the test of the advocate's ability, and of the innate justice of the cause he has argued on, the return, or the actual state of the case, will in its present bearing be most assuredly against us. If, as we say, this adoption of tenant-right would do so much good—give more income to the landlord, more scope to the tenant, more employment to the labourer, and more food to the people—if it would effect all this, how happens it such a practice does not naturally and generally extend itself? Although many of the reasons to be brought in answer here have already been adverted to, it will be necessary to collect and collate them previous to considering the means by which the right *can* be extended. In the first place, then, notwithstanding the increasing interest just now evinced towards the question, it is still one far from being generally known or understood; in the second, many who do feel the necessity for and advantage of working under such a protection, are debarred from pressing their claim to it by the unhealthy and over-eager competition to which they are exposed; and thirdly, the natural disposition of some men—and particularly of so comparatively retired a race as farmers—is of so indolently confiding a character, that until they do experience injury they will never be roused to guard themselves against it. On the landlords' part, the impediment may be prejudice for old customs, coupled with fear as to the result any "innovation" may have on his influence; or an unfavourable feeling engendered by his adviser, who is unwilling to impose on himself the trouble of letting the farms by any other than that standard agreement which most probably has done duty in the office for a century or so. The poet tells us how often

"Great effects from trivial causes spring;"

but is not the reverse quite as likely a consequence, and the action of many a great and good measure stayed by a combination of petty objections and, in themselves, inconsiderable proceedings?

That these hindrances will never be effectually overcome without some further steps to insure the working of the right is evident enough. By the aid of frequent discussion at public meetings, and repeated notices from the press, many of the more intelligent farmers and active landlords will, no doubt, give the subject a place in their agreements;

while, on the other hand, those who most require that impetus it carries with it would be left to keep on just as they so long have been. Tenant-right will never, or, at least, cannot for many years, come into general use from the efforts of such agency as this alone. Self-contented, unaspiring, stand-still tenants will pass it over again and again, precisely as they do now; and short-sighted owners, that, in the words of a noble lord who lately stood forward to represent them, "would rather keep to their old tenants and old ways than put up with new at double the rent," will "pooh! pooh!" its progress, as they are doing at present. Look, for example, as to the gradual spreading of tenant-right, at the petition of the Lincolnshire landlords against the passing of any enactment for insuring it—unintentionally the best argument that was, perhaps, ever offered for making such an Act. Say the Lincolnshire landlords—"We have tenant-right already; we have long practised and profited to the full by its advantages. What then can be the use of enforcing by law what we do voluntarily?" Exactly so. The action of tenant-right has brought the bogs and fens of Lincoln from the worst to be the best cultivated land in the kingdom, and doubled and trebled its value to both landlord and tenant. This has been proved and known for many years, and has of course proceeded to this very natural consequence. Neighbours first, and their neighbours again, *ad infinitum*, have gradually adopted so excellent a plan, until at length the whole country has learnt the secret of the men of Lincoln, and brought its acres to vie in produce with those of that once favoured district. Is it so? and is any further inducement for following your example so entirely superfluous? Or rather does not the tenant-right part (only) of the county of Lincoln stand out at this moment like an oasis from the north, south, east, and west territory by which it is surrounded?

This famous protest—and it will be worth while to proceed with it a little further—is framed in defiance of the first principle of legislation. Laws, be it remembered, are required not to compel the just, but to restrain the unjust; in vulgar phrase, "for rogues, not honest men." Now a good and just landlord that does his duty voluntarily, and gives his tenant full recompense for all he may not have reaped, needs no enactment to induce him to this. Such a law could in no way affect him, for he does and has done all so provided for without it. The object is to make others follow his example, and ensure their doing that by law that many would hesitate, from ignorance, prejudice, or a worse motive, to do of their own free will. Thus, the answer to all who join in with the Lincolnshire landlords is plain enough: if, as you say, you have the tenant-right secured to you by the custom of your own district, our new Act will to you be as nothing, either good or bad; all we want is to extend that custom to others. So, to the argument of the tenant, who, happy in this custom, or with a full confidence in the honour of that high family who always have and always will, he is sure, do him justice, let us reply that our only desire is to see other landlords like his. In the strength of his own position such a measure may sound superfluous enough, but it may yet be much required elsewhere. We have, however, heard some go further than this, and in the gratitude of their hearts declare that the very fact of legalizing tenant-right would be the greatest insult that could be offered to the good landlord; because, as they say, it would convey a doubt as to his continuing to show that justice which had never been doubted before. In direct contradiction to this, we affirm it is the highest compliment you could pay him; it is the stamped approval of the course he has pursued, drawing the eyes of all others upon him, and forcing them to imitate his well-doing. "Imitation," says the *Spectator*, "is, after all, the sincerest flattery;" though here, we think, it pays homage of a more sterling character.

But it may be demurred, before we proceed to frame new enactments entirely after this said example, it might be as well to see if there are any laws now professing to regulate the transactions between landlord and tenant. There are many; though, as far as any good or just consideration is concerned, they are almost all absolute nullities. To any one who could read over the Acts of this kind still remaining on the statute book, the necessity for some further addition to, or revision in them, would be strikingly apparent. As the state of society improves, as men gradually advance from comparative barbarism to civilization, it may be fairly assumed that corresponding alteration in those laws which affect their relative positions would accompany and facilitate such improvement. With agriculture, however, this has not been the case. Acts framed and passed when landlords were allowed the power of tyrants, and tenants were contented with the condition of slaves, are yet in existence, if not in actual use. So absurd and detrimental, indeed, would any application of them be, that landlord and tenant join together to prevent all possible reference to such relics of a by-gone age. The two unite, in the absence of anything better, to make a law fit for the times they live in; and yet what is the consequence of this being done by individuals, instead of being provided for by government, and so brought into general practice? Why, such a substitute becomes, in effect, nearly as injurious to the real advance of agriculture as the old law in all its one-sided power

of might would be. The agent whereby the new one is attained, and the old one avoided, is the long elaborate, technical agreement, stipulating and providing for everything; and this said long elaborate agreement is declared by all practical men to be the *greatest clog and impediment the tenant farmer can be burdened with.* It confuses and frightens him, stays him from attempting anything not laid down exactly by rule and rote in it, and haunts him with provisions and penalties prepared by lawyers who know little of farming, to be acted upon by farmers who know as little of law.

The agreement for the farmer should be made to suit the nature of the man, and be as plain, straightforward. and as little verbose as possible. In fact, a long "comprehensive" one, like a long rambling sentence, too often misses the point of that it aims at, and in striving to teach too much, finishes by defining little or nothing. In speaking of the arrangements made by Napoleon at one of his great battles, somebody observed in rather a derogatory tone, "that they were very simple:" to which Lord Byron replied, that he "had always been led to consider simplicity as one of the first elements of true greatness." Without going quite so far as his lordship, we may venture to affirm it to be one of the most necessary for real usefulness. To be truly useful and impartial, justice must speak the language of her people, and avoid in every way following in the steps of those senators of old who gave out their edicts rather to excite the awe than suit the understanding of those whose actions they were intended to influence.

To extend, then, and establish that justice involved in the rights of tenants—to let all alike participate in their advantages—can be accomplished by legislative enactment alone; but then comes the difficulty of making this enactment practicable, or of carrying out the principle into general use. The ways of letting differ so in different counties, we are told—what is indispensable in agreement here, is never mentioned there. In a word, so many and curious are the customs, that, instead of one Act only to embrace all the country, you must draw out a different one for every different district. Now, so far, we have treated the subject entirely in a general light, and have, on that account, carefully avoided citing individual examples, or going very minutely into any one particular feature. We maintain that course here, and argue that the legal recognition of tenant-right can scarcely be made in terms too general. Let it be admitted on the understanding that it *shall*, in effect, embrace every part of the country; and let the Act be as simple and as short as possible. Let it contain a definition of the principle, "a right of claim to compensation for unexhausted improvement," and we shall be satisfied. Customs may vary, and times for going in and out not always the same; but still the main point may be made equally applicable everywhere. A man that has purchased and put on manures in Devonshire ought surely to have his case as fairly considered and adjusted as if he had been living in Lincolnshire. A man who has drained or marled land in the south will do as much good to that land, and so should reap as certain a return, as if it had been in the north. The rate of labour perhaps, or the price of the material applied, may be higher or lower in one place than another; but this, after all, is nothing but what may be well met in the valuation. *By valuation*, then, would we make tenant-right feasible—by valuation would we accomplish for the agriculturist what has so long been done by the same means in every other kind of business, and than which nothing can be more straightforward or simple.

We had nearly added "or more just," but hesitate to use an epithet we find may not be admitted by all as appropriate. A not unfrequent charge brought against public writers, is that of raising objections to the cause they are engaged on, purposely to show how well they can overcome them. In a case like this, where opponents have been so very indefinite in the arguments offered *per contra*, this charge is likely enough to be repeated. Indeed, of so vague a kind has been the little advanced against tenant-right, that one is almost compelled to dress it up into something like a distinct reason before the point can be properly replied to. Certainly, one of the last objections we should have ever thought ourselves of putting up to pull down again, is contained in the following paragraph, which, beyond its novelty and plain expression, has an appropriateness to the feature we are considering that well justifies its introduction here. The writer, after condemning the principle of tenant-right wholesale, goes on more fully, as under. We should, though, premise the extract by stating that the author's definition of what tenant-right really is, or of that which is now being asked for, does not exactly accord with either our own, or in the preamble as given in Mr. Pusey's bill. In the passage we quote it will be observed that tenant-right is, in a great measure, taken to be the custom of some certain districts, where the in-coming pays the out-going tenant for tillages, for home-made manure, and almost every act or item required to carry on the cultivation of the land. As we should, of course, differ essentially from such a definition, we shall not enter on any controversy here as to the *principle*, but confine our answer to the *means* whereby the right may be enforced, and its claims

properly adjusted. On this point we can join issue, and so proceed with the objection to, and argued injustice of, award by valuation.

"The incoming tenant is to pay blindfold, according to a valuation to be settled by two valuers; that is, two farmers of the district, one, of course, the friend of the outgoer, both interested in keeping up the practice, and swelling the payable amount by which they may one day hope to benefit themselves, on quitting their own occupations. If the incomer demurs to the amount (of which the valuers, from a just distrust of their own competency, can be seldom induced to apportion the cost of the several items), if he inquires about an extra ploughing, or a larger quantity of dung than seems warranted by the present appearance of the turnip field, the labourers are then primed (like the celebrated 'damned soul' of the Custom House, who was formerly retained in Her Majesty's service to take all the requisite false oaths about other sorts of entries), the hirelings, whether for hedging or swearing, are ordered forward to support by their asseverations the tale of the outgoer; and thus to the fraud upon the incoming stranger is added the subornation and corruption of the living instruments bequeathed to him for the future cultivation of the land."*

This is a grave charge undoubtedly, though depending mainly for support upon the assumption of two "great facts:" first, that all farmers have an innate tendency to rascality; and second, that farm labourers are equally open to the attractions of perjury. These but admitted, and award by valuation leads on at once to universal robbery and corruption. Let us, however, proceed step by step to investigate a little more closely the weight of this astounding denunciation. Imprimis, then, the incomer pays, or as we should prefer saying, the outgoer receives blindfold—that is, on the estimate of two valuers, brought most likely from some distance off, and who know nothing personally about what they are going to decide on. But no, this is not the meaning of paying "blindfold," as the valuers, we are told, are "two farmers of the district," and who, as such, have of course had ample opportunity of seeing what has been done on the property they are going to judge "blindfold." Yet, unfortunately, any knowledge of what has been spent, and so what ought to be paid, has little influence with these men, their desire being the rather to keep up the custom they are now engaged on, as it may be their own turn one day to fall back upon it when outgoers themselves—well knowing, moreover, as being reasonable men they must, *that the longer such a custom will be acted on, the more will its use be upheld, the more one-sided and unfair an instrument it is made!* Still, to proceed, we do find, that with some show of justice, one valuer is appointed for each side, the landlord taking his friend, the farmer his; and then, if these cannot agree, we further see, they may call in as witnesses the workmen who have, or who have not, been engaged in applying the item about to be charged for. The carters who carried, and the labourers who spread the dung, on the quality and quantity of which the dispute arose, and who can surely tell pretty nearly how much there was, and of what sort it was—whether really *bonâ fide* artificial manure, or "the mere sweeping of ditches" put on for the name and form of making costs. Alas! such proof might do in Utopia, but decidedly not here; for every labourer in England is a "damned soul," ready to perjure himself again and again, at the beck of the tenant; and very naturally so, for it is all for his own interest to do it. This tenant (the one leaving) he will never, perhaps, see again; and so, the more wrong he can do the landlord, or the greater rent he can help to put on the one coming, the better of course will be his chance as "a living instrument" of being treated by that one, known, or fully expected to be his future employer. It is unbecoming and ungenerous to have recourse to harsh terms or hard names, but certainly, of all the ridiculous arguments we ever met with, this gross libel on the tenantry and peasantry of the kingdom is the most pitiful. How beautifully blended is the rogue and fool in the character of the farmer, when he is made to uphold the use of a custom by taking the most direct means for doing away with it! and how cheerfully—without one possible motive or incentive for the crime—is the peasant painted swearing away, not only his future happiness, but his worldly interest! We have to thank the writer for a tangible objection to tenant-right, and further to acknowledge a piece of good-nature on his part, that—according to the young Squire at the Vicar of Wakefield's discussion—is too much for any man to expect; viz., offering not only an argument, but giving us also an answer to it.

We gather then from the very heart of this objection, that if the amount of compensation cannot be at once agreed on between the landlord and the tenant themselves, two valuers can, in accordance with Mr. Pusey's Bill, be called in to estimate upon the fairest and most rational proof; both fully aware, from their own residence and practice in the neighbourhood, of what is to be considered really beneficial and what otherwise, and having further corroborative testimony in the evidence of the labourers—evidence which no court of justice would dare to reject. We next come to discuss

* Westminster and Foreign Quarterly Review for October.

what they should be called upon to value, or what items the tenant should be empowered to charge upon. The Tenant Right Bill thus classes them :—

1st, Temporary Improvement.—By the purchase of artificial manures, or the purchase of oilcake or linseed for cattle or sheep.

2nd, Durable Improvement.—By draining, marling, chalking, claying, or otherwise amending the soil.

3rd, Permanent Improvement.—By forming or constructing new fences, water meadows, roads, or suitable buildings.

We would, however, prefer putting them under two heads only, as improvement which it is the proper business of the farmer to proceed with, and that which had better come direct from the landlord—"Landlord's Improvements" and "Tenant's Improvements." The temporary and durable will be at once admitted as fit employment for the capital and labour of the latter, embodying as they do the great requisites for good and profitable farming; while the permanent—the building, road making, fencing, and so on—should, we think, be done by the owner, or, at any rate, only undertaken by the holder on some special agreement. We have heard it advanced with much reason, that to give the merely temporary cultivator of the land a power of making and charging for any new buildings or fences he may choose to erect would be imbuing him with too great, and the owner with too little, command over, and interest in the soil. Such a clause too, we fear, gets beyond that extreme simplicity with which we would have the measure carried out, and, indeed, can scarcely be brought within the accepted definition of tenant-right, viz., compensation for *unexhausted* improvement. Now the term unexhausted applies clearly to, in different degrees, both the temporary and the durable—the means taken for, in the words of the bill, "amending the soil;" while the unexhausted good left at the end of a term in a barn or a stable is so entirely a different feature as to warrant, we should say, a different way of meeting it. In short, the third class of improvements, as so divided by Mr. Pusey, appears to us rather a clog to the general working, as with many we feel confident it will be a great source for objection to the passing of the bill. In this view of the matter we are in a great measure supported by the opinion of the Tenant Right Committee of the London Farmers' Club, appointed purposely, at Mr. Pusey's request, to go through the different clauses, and who, in their report, thus express themselves on this point:—

"Do recommend that all items respecting buildings, roads, and fences, be left out of this bill, and that a clause be added, or a supplementary bill be prepared, to afford tenant farmers those privileges in the removal of buildings erected by themselves which manufacturers and tradesmen now enjoy—the landlord having, in the first place, the option of taking all, or any, by valuation."

This, in fact, is but further evidence of the tenant-farmer being still, as the law stands, regarded as little more than a serf, or, at least, a steward; obtaining, may be, some reward for his care and industry, but with no recognized claim for what he may have spent on his services being dispensed with. If a man erects a building for any possible purpose *but* that of agriculture, he may, on quitting, pull it down again and take it with him. The law allows it to be his; and if the landlord will not buy it, the tenant may sell the material to another, or carry it away for use elsewhere. While it provides for and protects one, the law oppresses his neighbour, by suffering a measure so out of all date yet to exist; an enactment the action of which, if ever through ignorance or carelessness permitted to come into force, can only be used to serve the ends of injustice. Once more we say, let the farmer be placed in the same condition, have the same acknowledged rights as other men who live by their labour—or, with the Tenant Right Committee, "let him have those privileges, in the removal of buildings erected by himself, manufacturers and tradesmen now enjoy."

It would be both presumptuous and unnecessary to offer any lengthened comment or analysis of a bill prepared with so much care and ability as that introduced by Mr. Pusey; still, in taking it in a great degree as that which the Legislature ought to adopt, we may call attention to one grand drawback as it now reads. Justice, to be justice at all, must be *universal* in its influence—must be made compulsory on all in its action, or will necessarily be partial in effect. Justice, by the Tenant Right Bill, is for those only that like it; merely an optional matter, which a man may take or leave alone, just as he would or would not a glass of wine. If there be sufficient call for, or truth enough in, the measure to pass it at all, surely the Act should go forth free from such a palpable self-contradiction or suicidal clause as this "amendment"—one which, we believe, was forced upon the original framer of the bill, and for which he cannot be well made accountable:

"Provided nevertheless, and be it enacted, that nothing in this Act contained shall alter or affect the rights of landlords or of outgoing or incoming tenants under any agreement or custom, unless as hereinbefore provided; *nor prevent any agreement between landlord and tenant exempting themselves from the operation of this Act.*"

We are often told, half in jest half in earnest,

that no inconsiderable labour in a session is to do away with or destroy the power of acts passed in the previous one; but here we have a model measure with a vengeance, as it goes far to do away with itself—*hoc opus est* indeed. Those who have sufficient perception to see the justice and advantage of tenant-right may avail themselves of it; others, who through obstinacy or ignorance have opposed its progress, and for whom, above all, the Act should have been constructed, find themselves rather more independent than ever of it. No growing custom now with which it might be civil or politic to fall in, but the acknowledged law of the land, and one, moreover, that the law-givers go on to assure us any man may defy it if he chooses.

It is but another of the less favourable traits in human nature that people frequently begin with a far better feeling than they close their dealings one with another, and we can readily picture the too-confiding anxious tenant talked-over in something this wise—"The landlord and his agent always had an objection to the Act; they thought it uncalled for from the first. Every man will of course do everything that is fair without such a prompter to force him; indeed they have made it a rule to insert a clause in all their agreements against the action of the Tenant Right Bill. Notwithstanding they will do all it could justly demand," &c., &c.

Extreme magnaminity being thus made the stalking horse by which the farmer is bowed into the holding and out of his right. Once in, as likely as not he sits down by his new hearth to quietly read his agreement over again; and then, as likely as not too, if he be a man of any worldly experience, he begins to doubt. Now doubt, as we have before intimated, is the great enemy to all energy, skill, and exertion; and so our new comer narrows his views, and ends as he began, with very little left for the queried sense of right in his landlord. Or, in the other case, he does *not* refer any more to his parchments, but goes bravely into his work, with a good heart and an open hand—finishes in the same way he commenced, and at length prepares, as his term expires, for a settlement. His friend, the agent, is now the master's man of business, and occasion is soon found to remind him of the something a little more liberal promised, though not actually written down. The agent, with a faint smile, thinks they had better keep to the "black and white," and not attempt to do business on anything so indefinite as what either of us may have said six or seven years ago. And keep to the black and white he does with the most legal accuracy, until at last the deluded victim rushes off to *his* adviser to know if he cannot enforce his right to compensation, and compel his landlord to behave as he was made to believe he would. Of course he can; there is an act framed purposely to meet such cases. Yet stay; how runs the agreement on this head? "Why, my good sir, how can you come for compensation, when here you have signed and sealed to say you would *not* have it?"

Any man who shrinks, from binding himself down to do a common act of justice, by vaguely promising to do as much, or perhaps a great deal more, should always be regarded with suspicion; however good and true he may really be, there is a false pride in one proclaiming himself so immaculate, and so superior to the laws which regulate the actions of common men. It is not right either that any man should have such a power; and so again we say with the Farmers' Club—"Let clause twelve be wholly erased, and clause eight of the original bill, providing that no contract contrary to the purport of the act should be valid, be substituted for it."

The natural advantage likely to accrue from the establishment of tenant-right becomes so thoroughly and prominently a part of the whole question, that we have preferred not to make it one separate feature in our treatment of the subject; a few words, however, addressed to that particular point may not be out of place in concluding this paper. The paramount duty of the government—the basis of the national prosperity—is the well-doing of the people; and that people at this very moment are suffering, more or less, from two great evils of over-population—a want of employment and a want of food. In direct antithesis to this, the producible land of the kingdom is cultivated as if there was actually scarcity of labour. The natural question that arises here is, how comes it that one evil is not made to destroy the other—by the application of the labour to the land? Simply because there is a hesitation as to embarking capital to bring them together; and yet, in the face of this hesitation, it is generally allowed that nothing will pay a better interest than money laid out in the improvement of the soil. The people want employment; the land wants more cultivation. The use of capital refused; and yet no use of capital known to pay better. Paradoxes explained and removed by the one simple remedy and right—SECURITY. Give but that, and you will make the island, as it should be, mainly dependant on its own resources for food, and its people for support. The national advantage must increase from such an increase of labour profitably employed, for money is really but the representative of labour so directed; and consequently the more labour profitably employed the more wealthy must the country become.

This is a remedy, moreover, that might be applied without sacrifice or expense to any one. The

people would experience no revulsion to their ordinary habits, the Government no embarrassment from the effects of it. It is only making general an act of justice that has proved strikingly advantageous wheresoever it has yet been administered.

AGRICULTURAL SUGGESTIONS.—MARCH.

BY J. TOWERS, MEMB. R.A.S., H.S. OF LONDON, &c.

The appropriation of a process, or of processes, to the several periods and seasons of the year, would form a great improvement in agricultural communications. Seasons, climates, and soil are, however, so essentially different, that therein alone great difficulty would arise. Still, an approach may be occasionally made; and now a subject of great consequence presents itself, which I am called upon not to neglect.

Much has already been written upon kohl-rabi (the turnip cabbage): the opportunities of watching the progress of this fine bulb during seven months, and its consumption on the farms of East Surrey, have left no doubt remaining of its general excellence; but some additional facts of *particular* consequence have become known, which demand immediate attention. I find that here, in the rich district of Surrey, where alone I have observed the culture of kohl-rabi to prevail, there are differences in practice, some of which are very superior to others; that method, therefore, which appears to produce the greatest bulk of cattle food, and of the finest quality, shall now be described.

The period of sowing is of the first consequence, especially as no time is to be lost; and, indeed, it is rather to be regretted that notice was not given of it in the last magazine.

There are, as before was stated, two varieties—the purple and the white bulbed; the former is rather more hardy, and perhaps coarser; but both are introduced, and are generally sown separately, in long rows, from nine to twelve inches asunder, on a slip of land at one side of a field, which is to be finally stocked by the bulbing plants; and the time for preparing these seed-beds is the *last week of February*, and thence, at the latest, to the *15th of March*. The earth need not be made rich by manure, it being quite sufficient that an ample stock of sturdy seedlings be procured, fit to remove at the middle or latter end of May. But then, in order to succeed even in raising seedlings, a dry bottom and deep tillage are required. A good hazel loam is certainly the best natural medium; but so hardy and accommodating is the plant, that it will take to most soils. Farmers are generally too tardy: they fail by omitting to seize time and opportunities. This fact becomes yearly more evident in all the crops. We see oats, barley, and wheat suffering from want of strength, just at that period when the heat of spring sets in; whereas, had the rootlets—those extensive feeders—gained possession of a bed two feet deep by the early days of April, the green parts above ground would not have flagged and become torpid under the burning suns which, of late years, have suddenly burst forth in May, and continued to parch the ground till the season of swede-sowing, which has thus been fatally retarded.

During the early growth of the kohl the hoes must be frequently employed; and from time to time the plants are to be so thinned as to insure the regular growth of all. There must be no such thing as contact, but space must be allowed to the full extent of that given to a seedling bed of broccolis prior to their removal to the nursery rows. In fact, the two varieties of kohl bear a very apt resemblance to those of the purple and white Cape broccoli. To the period of transplantation no appearance of bulb is visible; the stem is equally simple, firm, and erect, and its summit supports the long and sub-erect leaves.

We are not yet prepared to give a decisive opinion of the manure which is particularly applicable to kohl rabi—the constituents of the plant not having been determined by organic analyses. But as farm and fold-manures have hitherto sustained admirable crops on the few farms whereon the culture has been resolutely pursued, we need not hesitate to rely upon that old and well proved appliance. As every kind of turnip sends forth its absorbent roots widely, and as the swedes and round turnips are liable to fail in dry seasons, deep and effectual drainage, subsoiling, and enrichment are imperatively called for, and must be employed by every one who would ensure success. Without these operations, the miserable results so ably described by Mr. Pusey, in his introductory article to "The Journal of the English Agricultural Society," ought to be anticipated.

Transplanting.—The turnip-cabbage requires this operation; its habits are much at variance with all others of the *brassica* family, and that to a degree which (*agriculturally*) might warrant a separation from the genus; although (*botanically*) its organs of fructification may establish its position among them. The ground of the seed-bed being kept

open by the hoes, it is customary to pull up the plants by hand; and if its state as to moisture be moderate, the roots rise pretty freely. Yet the method cannot be justified, since very great injury must be inflicted on all the finer absorbents, thus arresting growth and causing loss of time. It were surely more wise and workmanlike to lever the plants by means of a light three-tined garden-fork, which would expedite the operation in every way.

I have spoken already of the thorough preparation of the soil throughout its entire extent; but it would be an improvement to plant-out on manured ridges, from 27 inches to 3 feet apart, after the manner of the Scotch turnip culture; and it would be as well to try the effects of bones, reduced by sulphuric acid. A few ranks here and there, in near position with others *not boned*, would quickly determine the effects; but particular care should be taken that the soil of the ranks to be compared should be as little different as possible.

When the planting by dibble has been well executed, in soil duly comminuted, and closely pressed into contact with the roots, the plants soon become erect, and with the first shower begin to grow. The progress gradually, and, during growth, should be kept clean by the hoes as long as possible, for they soon obtain a large expansion of foliage; and then the summit of the stems near the base of the leaves begins to flatten and extend in breadth like the head of a mushroom; this head becomes convex, the footstalks of the leaves repose on the sides of the now visible bulb, which takes a globular form, and increases rapidly in bulk, varying in size and weight—the latter ranging from two or three to eight and even ten pounds, without the leaves.

Sheep feed eagerly on every part excepting the hard and fibrous pedestal that serves to elevate the bulb some inches above the soil. I saw a large flock, on the 7th of January, hurdled off, with their fine lambs, feeding on the entire plants; and it may be safely asserted that, had not these been cultivated, so destructive was the weather, little or no food could have been derived from turnips around the vicinity of Croydon.

To conclude this article, I extract the following from No. 1,264, vol. ii., p. 29, of Mr. Stephens' "Book of the Farm;" the only statement on a practical authority that has come under my observation. "The turnip-stemmed cabbage or kholrabi (*Brassica oleracea, caulo-rapa alba* of De Candolle). The varieties of this plant are numerous, but the best suited for field-culture are the red and green sorts. It is a native of Germany, where it is much cultivated, as it is also in the low countries and the north of France, where it is given to milch-cows, *for which it is well adapted*, on account of its possessing little of that acidity which is found in the turnip to affect butter and milk. It is taken up before the frost sets in, and stored like potatoes or turnips for winter use. Its habits and produce are similar to the Swedish turnip, the part of the plant resembling which is a swollen bulb at the top of the stem, which, when divested of leaves, may be readily mistaken for a swede. Sir Thomas Tyrwhitt first introduced it to England from Germany."

Croydon, Febuary 8th.

THE MANURE OF BOX-FED ANIMALS.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

It is with much satisfaction that every friend of agriculture will hear from so many practical farmers the progress of the box-feeding system, so long advocated by Mr. Warnes, of Trimingham. It will probably, under certain modifications, become generally adopted; and even if the plan of allowing the manure to accumulate under the feeding animal to a large extent, is found to be injurious to its health, and of very doubtful advantages to the good quality of the manure, it will be easy in this respect to vary the present custom so as to render it more wholesome for the animal, yet equally productive of rich manure. To those who are unacquainted with the general results of the system, I can hardly afford a better description than that recently given by Mr. G. Nicholls (*Jour. R. A. S.*, vol. viii., p. 473), who, on his visit to Mr. Warnes' farm, "found thirty bullocks put up in the boxes for fattening. They were of a mixed character, mostly of the shorthorned or polled kinds, some Scotch, some Irish, some home-bred. Several of the animals were nearly fit for the butcher, others in various stages of forwardness, and some had only just been taken up. These last were kept upon cut grass without linseed, it being necessary to bring them gradually to a richer description of food. A constant succession is thus maintained, lean beasts coming in as the fattened animals are taken off, generally within six months of their being first put up; and thus the boxes are never empty. Nothing could be more comfortable in appearance than the animals which had been up some time. They had become accustomed to their boxes; were protected from every annoyance arising from heat and cold, the weather, or insects; were kindly treated, and appeared the very picture of animal enjoyment. On entering the boxes, instead of being shy or alarmed, they approached and solicited attention, and seemed pleased at being scratched and handled. Their eyes were bright and clear, their coats sleek and glossy; scarce a speck of dirt or soil could be found on any of them, although each moved about

unrestrained in its box. Some were eating the compound of cut grass and linseed, some were lying down ruminating their food, some sleeping; but all evidently in thriving condition, and partaking of a joyous existence. The contrast between these animals and a number of feeding beasts which I afterwards saw in a large field adjoining part of Mr. Warnes' farm," continues Mr. Nicholls, "was most striking. The weather was hot, and the gad-fly troublesome; and these poor beasts were running and racing about to escape from the enemy, worried and heated, and in a state of great irritation and discomfort. In the boxes the animals were screened from the sun, protected from flies, and in the enjoyment of the perfect quiet and repose so essential for fattening; whereas in the field the cattle were in a constant state of effort and excitement, preventing the development of flesh or fat. In the boxes the dung and urine are preserved, mingling with the bedding, and forming a most valuable manure, always available for application to the land. In the field the dung and the urine are for the most part lost, the finer particles being washed away by rain or carried off by the atmosphere. How widely different must the results be to the farmer in these two cases, especially when tested on a large scale! These boxes are from eight to ten feet square, very similar to horse-boxes. In these the animals are fed, and here they remain from the time they are put up until they are ready for the butcher, which rarely exceeds six months, and is often less. Two sets are thus fattened in the course of the year, the feeding being continued winter and summer. Each box is sunk two feet, and forms a kind of tank at bottom, in which the manure is allowed to accumulate, fresh litter being added from time to time, as the bedding becomes wet or soiled. All the dung and urine are thus absorbed by, and mingled with, the litter, which is trodden by the animal into a solid, compact mass; so that no portion is lost by evaporation or otherwise. The effect upon the animals by being thus confined over a bed of compost is naturally enough regarded by the visitor with some suspicion. We are told, however, that 'the animals did not seem to suffer in any way from standing continually on this accumulation of manure. They appeared sleek and healthy. and evidentlyin a thriving condition, "and as far as I could judge," adds Mr. Nicholls, "and from all that I learned by inquiries on the spot, the boxes appeared to answer perfectly with respect to the cattle, while the manure obtained by this method is large in quantity, and very superior in quality." Such are the observations of a warm and enlightened friend of the box-feeding system. In his doubts as to the effect of the decomposed manure upon the animals confined over it I entirely concur; and if I doubt the correctness of thus preparing the farm-yard dung, I do so from a conviction that it is more conducive to its value to dilute the urine of the stock with a certain portion of rain water than to prepare the dung from the straw and undiluted excrements of the animals. Many have been the tough arguments I have heard on this very point amongst the Suffolk and Essex farmers, but the general leaning of my mind from all I have witnessed, and heard from long experienced farmers, is, that a moderate portion of water added to the dung of live stock rather improves than injures the goodness of its quality. My readers will, in considering this case, remember that in making the comparison between the drier and the moist system, all drainage must be in both cases regarded as being carefully prevented, and in fact that in both instances every portion of the excreta of the animals is preserved and sufficiently decomposed before it is carried on to the land. Under such circumstances it does appear probable from the very interesting researches of M. Sprengel, that the addition of a certain portion of water to putrefying urine very materially increases the proportion of the ammonia produced. This distinguished chemist analyzed urine in three different states (*Johnson and Shaw's Farmers' Almanac*, vol. ii., p. 31)—1st, when fresh; 2nd, after being putrefied by itself: 3rd, after being putrefied and previously mixed with its own bulk of water. When fresh, 100,000 parts he found to contain 205 parts of ammonia; but after putrefaction this proportion of ammonia was increased to 487 parts, or considerably more than doubled; and when watered previously, it was then found to contain, after putrefaction, 1,622 parts of ammonia, or nearly eight times the quantity it did when fresh. The following are the results of his analysis :—

	Fresh.	Putrid.	Watered.
Urea. . .	4000	1000	600
Albumen . . .	10	—	—
Mucus . . .	190	40	30
Benzoic acid . .	90	250	120
Lactic acid . .	516	500	500
Carbonic acid . .	256	165	1533
Ammonia . . .	205	487	1622
Potash . . .	664	664	664
Soda. . . .	554	554	554
Silica . . .	36	5	8
Alumina . . .	2	—	—
Oxide of iron . .	4	1	—
Oxide of manganese .	1	—	—
Magnesia . . .	36	22	30
Chlorine . . .	272	272	272
Sulphuric acid . .	405	338	332
Phosphoric acid .	70	26	45
Acetic acid . .	—	1	20
Sulphuretted hydrogen . . .	—	1	30
Insoluble earthy phosphates and carbonates . . .	—	180	150
Water . .	92624	95444	95481
	100,000	100,000	100,000

I hardly deem these fresh objects for inquiry to afford any reason for our regarding with less favour the box system of feeding. If it is found that my conclusions are correct, and that, whatever superiority the system possesses over the ordinary mode, the quality of the box manure is capable of greater improvement, this will merely lead to the adoption of greater cleanliness, or more frequent and more wholesome removal of the litter. The principles of the box-feeding I conclude to be generally correct, however imperfect I may deem some of its details.

LECTURE ON THE SOILS OF EUROPE.

BY MR. WHITLEY TRURO, DELIVERED AT THE ANNUAL MEETING OF THE PROBUS FARMERS' CLUB, JAN. 15TH, 1848.

Mr. President and gentlemen, this lecture is on the soils of Europe; you will perceive, therefore, that we have not to discuss abstract theoretical principles, but to describe existing facts. I shall, however, lay before you in the first place, as the basis and guide in our present inquiry, those general and acknowledged principles on which the nature and fertility of soils depend.

Soils have been generally derived from the rock on which they rest, and their fertility is mainly dependant on the composition and structure of the parent rock. The production and fertility of soils are much influenced by climate and elevation. Alluvial soils, deposited by rivers in valleys and plains, owe their natural productiveness to the nature of the strata whence the sedimentary matter was derived.

I have endeavoured to apply these principles to the subject before us, by comparing the statements scattered through various writers with this geological map, and to generalize and arrange the matter so gathered.

Continental Europe consists of a mass of sedimentary deposits, elevated at various times above the level of the ancient sea, by the movements which accompanied the eruption of the Plutonic rocks. The Alps, and other mountain chains, form the monuments and the records of these mighty changes: here nature unveils the greatness of her power. The rent and contorted earth, the highly inclined strata, the numerous volcanic products, and the towering granite mountains, capped with eternal snow, and almost lost amid and above the clouds of heaven, are the characters by which we read the history of the fearful convulsions which shook, rent, and elevated a continent.

On the flanks of these mountain chains, and over those countries most intimately connected with mountain ranges, the secondary formations are distributed, lying at such a height above the sea, and possessing such a climate as to admit of successful cultivation, the most conspicuous of which are the grauwacke, the new red sandstone, the oolite, and the chalk. The basins and plains nearest to the elevated ranges are occupied by extensive tertiary formations and alluvial deposits, which form the seat of the most successful agricultural exertions. Such is the general condition of the land of the whole of central Europe; but when we turn our eyes to the north, we meet with a country whose physical aspect is quite the reverse of what we have described. The blue and elevated summits of the mountains are no longer seen in the distance. But as far as the eye can reach—east, west, north, and south—the horizon, like that of the ocean, seems on a level with the eye, save where the forest oak or the spreading limbs of the chestnut intercept the view. In fact, the whole of northern Europe (save the mountain tracts of Norway and the extreme north of Russia), from the north of France, through Holland, Prussia, Poland, northern Germany, and southern Russia, to the Uralian mountains, is one vast extended plain.

Having thus given an outline of the physical geography of Europe, I shall class my remarks on its soil under two heads, namely—first, the soils of the elevated countries, formed by the primary and secondary formations; secondly, the low countries, formed by the tertiary and more recent formations.

The high mountainous districts rise into an atmosphere too cold and moist for agricultural operation. The snow line in central Europe is from 8,000 to 10,000 feet above the level of the sea; beneath which is a zone of dreary sterility, alternately bound by severe frost and swept by mountain torrents; then a few lichens and Alpine plants appear, followed by hardy shrubs, which increase until the verdant green of the forest covers the mountain sides. The increased productiveness of the soil in a journey from the Tyrolese Alps to the fertile plain of Upper Italy is thus described by Inglis: "We have first Alpine productions; but to pass these over, and to note only the productions of cultivated land, we have first the barley, thin and scanty, and a few hardy vegetables. We come next to Indian corn of a poor growth, with barley more vigorous, oats, grass, and firs. The third gradation brings us to a little wheat mingled with all these, and to some walnut trees, besides fir. In the fourth division of the valley (the Adige), we find Indian corn and wheat growing luxuriantly, vines beginning to appear, and fruit trees, especially the cherry, in abundance. The fifth gradation shows us, with all these productions, vines in luxuriance, and magnificent walnut trees, entirely superseding the harder wood. At the sixth step we find some additions to these: the mulberry begins to appear, and fruits of the most delicate description are found. The seventh division pre-

sents the vine in its perfection, the mulberry in its abundance, and the fruits we have seen before in greater luxuriance. The eighth and last gradation shows us, with all we have seen before, the olive, the pomegranate and the fig" (*Pictorial Tour*, p. 490).

The principal range of the Alps running eastward from France to Hungary is composed of granite, gneiss, and mica schist, which is often calcareous. The mountains which encircle Bohemia are principally one vast mass of granite and gneiss; the soils formed by the decomposition of these rocks are loose and friable, easily washed by the mountain torrents.

But an important feature is presented by the mountains which form the eastern boundary of France. The Coltinian Alps and the Jura mountains, these are formed of vast accumulations of limestone (known as Jura limestone,) and corresponding with our oolite. The rivers and mountain torrents which descend from these heights, carry down with them a large quantity of carbonate of lime, which has been one principal cause of the fertility of the rich alluvial soil in the plains. The Apennines which run through the centre of Italy are formed of limestone, from which innumerable calcareous springs arise, to descend and water and fertilize the plains below.

But whilst mountains in general are sterile and unproductive; the districts connected with volcanic mountains, and the elevated countries composed of ancient lavas, must be recorded among the most fertile portions of the earth. The sloping sides of Vesuvius, and the hills and plains by which that volcano is surrounded, present a scene of the most exuberant and charming fertility. The soil, composed of decomposed lava, is a deep friable loam, frequently producing two crops in a season, and supplying a population of 80,000. "Had the fundamental limestone of the Apennines remained uncovered throughout the whole area, the country could not have sustained a twentieth part of its present inhabitants" (Lyall). The air also, in consequence of the elevation and structure of the soil, is clear and salubrious, so that the earth and sky have bestowed their best gifts on this happy country. "See Naples and then die," says the Italian proverb.

The land at the foot of Mount Etna is of the same fertile character: the tertiary formations are there mixed with volcanic products, and form the soil of a portion of that fertile country, once the granary of ancient Rome. But the most striking instance of the fertility of volcanic districts is that furnished by the ancient lavas of central France. The district which is the site of these ancient volcanoes is a plain about 40 miles long and 20 broad, called the Limagne of Auvergne, being about 1000 feet above the level of the sea. The calcareous and alluvial deposits are mixed with decomposed soft basalt, and form a soil of unrivalled composition and fertility.

We turn now to the secondary formations, which lie along the flanks of mountain chains, and cover the whole of southern Germany and the basin of Bohemia.

The grauwacke formation is largely developed in the southern part of the Duchy of the Lower Rhine, and extends eastward into the adjoining states, covering an area of about 12,000 square miles: the surface is hilly and generally under arable culture and wood. The soil is similar to the loams and clays on the slate in our own country, except where it is mixed with the transitic limestone, which renders it more friable and productive; on the whole it is not remarkable for fertility. But a vast change is effected in the structure of this soil by its mixture with the volcanic rocks found near the banks of the Rhine; by their decomposition and admixture a rich and luxuriant soil is formed, being a very hot-bed for the cultivation of the grape, and consequently vineyards are profusely scattered over this beautiful country. It is from this soil the Rhenish wine is principally produced.

The most extensive secondary formation developed in central Europe, is that which supports the most healthy and productive soil—the new red sandstone, covering an area about 300 miles long by 100 broad. The surface of the country is undulating and in some parts very hilly, the high lands being generally occupied by forests, and from the friable nature of the soil the whole country is one of the most richly wooded in Europe. The soil is variable, as the sandstones or red marls prevail, and when if a sufficiently loamy character it is very productive. The red soils around Exeter will convey a good idea of this district. The secondary formations are further developed in Saxony and Bohemia, and form a dry and healthy soil, cultivated with great care and diligence.

On the whole, the soil of Germany is such as to invite and amply repay the labour bestowed upon it, and the industry which characterizes the German character has most probably been formed by the circumstances in which he has been placed.

Before I describe the soils of the plains of Europe, I shall refer to those of France, which cannot well be classed under the latter head.

The low lands of France may be said to embrace two large basins—that on the north, of which Paris is the centre; and the valley of the Garonne on the S. W. These basins are principally occupied by the gravels, sands, and marls of the tertiary formation; where the gravels prevail a poor thin soil is the result, but the most prevailing soil is a strong calcareous loam very productive. The valley of

the Garonne is composed of friable, sandy calcareous loam, with moisture sufficient for every purpose. The adjoining soil on the chalk is thin and unfruitful in grain, but the loam of the chalk marl forms some of the best corn land in the kingdom. The richest part of France is the northern division, comprehending the provinces of Flanders, Artois, Picardy, and Normandy, where there is a deep rich loam about 18 million acres in extent. The valley of Lanquedoc is also extremely prolific. In Bretagne, Anjou, and Mayne, are extensive heaths; and on the south-western coast extensive tracts of sand produce nothing but broom, heath, and juniper.

France possesses a soil and climate capable of furnishing her numerous inhabitants with all the necessaries of life; but the land is badly cultivated, and subdivided into miserably small holdings.

Let me now request your attention to a subject which I am desirous of setting before you in as clear a light as possible—the soils of the plains of Europe. To understand the nature of these aright there is a preliminary inquiry on which we must enter, viz. the nature of the alluvium; that is, the mud and slime brought down and deposited by the rivers. I have before stated that many of the European rivers have their rise, and flow for some part of their course over limestone rocks, and those not of the hardest nature, but classed with our chalk and oolite. The limestone being broken and intersected by trap and granite. The detritus brought down therefore by these rivers consists of volcanic and granitic sand, mixed with decayed vegetation and much carbonate of lime. Where the water of the Rhone enters the Mediterranean, it discolours the blue waters of that sea with a whitish sediment for a distance of six or seven miles from the shore. The river Po affords a still better illustration; the quantity of fine sand, mixed with mud and carbonate of lime, is so great, that the top of the Adriatic Sea is rapidly filling up. From the northernmost part of this sea down to the south of Ravenna, there is an uninterrupted series of recent accessions of land, more than 100 miles in length, which, within the last 2000 years have increased from 2 to 20 miles in breadth. Through the lower part of its course the Po is confined within high embankments, which require to be continually renewed at a great expense. At Ferrara the bed of the river is above the tops of the houses; and when the floods come down the inhabitants fly to the dykes, under pain of death.

The fertilizing property of the mud of the Nile has long been known, an analysis of which will give an idea of that of other rivers; it contains nearly one half of argillaceous earth, and about one-fourth of carbonate of lime, the remainder consisting of water, oxide of iron, and carbonate of magnesia; thus this mud mixed with the river sand and humus, forms a soil of extraordinary fertility.

We have an example on a small scale in our own country, in the lands reclaimed from the Camel, by embankments at Wadebridge. Now you will see the bearing of these remarks, when I inform you that extensive tracts of cultivated land in Europe are composed of this alluvium. Not only is it found at the mouths of various rivers, but drifted by currents, it has formed the rich low lands bordering the German Ocean, and the south shores of the Baltic. From the fertile plains of Holland, to the splendid pastures of Holstein and Sleswigh in Denmark, this soil is found. In the great plains of Europe it is mixed with the tertiary and more recent strata; it is spread out far and wide along the banks of the rivers; ancient lakes have been filled by it, whose waters eventually bursting the rocky barrier by which they were confined, have left their slimy beds, to invite the industry of man and amply reward his toil. Time will only permit me to give you one instance.

From Frankfort on the Mayne, southward along the banks of the Rhine for nearly 200 miles, there is a remarkable deposit of this character: it consists chiefly of argillaceous matter, combined with a sixth part of carbonate of lime, and a sixth of quartzose and micaceous sand, forming a calcareous loam of a dirty yellowish grey colour. In some localities the entire thickness is from 200 to 300 feet, and it fills the valley of the Rhine, 30 miles in width and 200 miles in length. I need not say that this soil is extremely productive, and fitted to all the operations and productions of agriculture.

It has been ascertained that the waters of the Rhine, when evaporated, leave a residuum of calcareous loam not distinguishable from this soil.

But, further, let me now direct your attention to another circumstance in the geological history of Europe, which is intimately connected with the nature of the soil on the plains. Its whole surface, particularly that of northern Germany and Prussia, bears evidence of having been swept and deluged by some mighty flood, accumulating vast beds of silt, sand, and gravel, and strewing the provinces north of the Alps and the Carpathians with massive blocks of granite, swept from the Scandinavian mountains. These transported materials were formerly called diluvium: it is in geology more fashionable to call the deposits drift. I am not now called on to speculate on the nature or extent of this catastrophe, but to show you its effects. This, so far as relates to our present subject, is manifested on the plains, where large accumulations of gravel and beds of silicious sand present a surface, dry, barren, and uninviting to the husbandman's toil.

The industry of the Flemings has, howeve ,

triumphed over these obstacles, and agriculture is pushing her conquests even among sandy heaths. But these sands are more generally mixed with mud, marl, and peat, and then form a sandy or clayey loam, as the different materials prevail. Now this drift, with the tertiary sands and marls mixed with the alluvial river deposits which I have before described, forms the basis of the soils on the great European plains. I shall now proceed to point out the situation and extent of these plains.

The plain of the Lower Danube, embracing the Turkish provinces of Wallachia and Bulgaria, is 300 miles long by 100 broad: near the river a rich alluvial soil prevails, with tertiary and calcareous loams inland. Manure is never used; but after a crop of corn the land is left fallow for a season, and then sown with wheat, barley, or maize, which are the principal crops; but the wheat in quality is 20 per cent. inferior to that of England.

Next, the plain of the Middle Danube, constituting the greater and less Hungarian plains. The plain of Upper Hungary is more fertile on the north than the south side of the Danube, but it everywhere produces good and abundant crops of corn. The great Hungarian plain is in extent 4000 square miles larger than Ireland, with no part of it 100 feet above the Danube. With the exception of some marsh lands near the Danube, and some sandy tracts, the whole of this plain contains some of the richest soil of Europe, and everywhere produces good and abundant crops of corn; it is particularly adapted to the cultivation of wheat, which is largely exported. Manure is seldom or ever used, as it forces too much straw; and the dung of the cattle is either burnt by the peasants, or thrown into the rivers. Mr. M'Culloch says, "were the agricultural skill of the Lombards transferred to Hungary, this province would in time of scarcity supply food for all Europe," but that "the want of a market for their corn has obliged the Hungarians to prosecute on a large scale the raising of sheep and wool."

We come next to the Upper Danube, forming the plain of Bavaria. In this kingdom agriculture is in a very backward state; but the plain around Munich, on account of its productiveness, is the best-cultivated part, and has been styled "the granary of Germany."

One of the richest and best cultivated districts of Europe is the plain of Lombardy, lying between the Alps and the Apennines, and watered by the Po. The soil is principally alluvial, especially near the river, and the dryer lands are watered by a most beautiful and effective system of irrigation; these meadows are found to be more productive in grass than in corn, yielding three crops of hay a year—about eight tons the English acre. It is from these pastures that the rich Parmesan cheese is made. But I pass on to call your attention to the leading feature of the low lands of Europe, viz. the great northern plain, extending from the north of France through Belgium, Holland, Northern Germany, Prussia, Poland, and Russia, to the Uralian Mountains.

The original stratum of which the greater part of this plain is composed, is the diluvium or drift before alluded to. It is described in De Luc's geological travels, as consisting principally of a fine silicious sand, intermixed with clay and marl, with occasional beds of gravel, and large granitic blocks: this he calls "the continental soil;" in some parts he discovered beds of white marl, which the inhabitants burnt for lime with dried peat. Where the sand is loose and pure, extensive sandy heaths are formed, unfit for cultivation; but when mixed with clay and marl, a good loam is produced. The surface of the country is slightly undulating, the highest portions having a light sandy soil; the slopes being more productive, whilst the valleys generally consist of fertile meadows, from river deposits and peat being mixed with the native soil. Along the banks of the different rivers at their mouth, and along the adjoining coasts, are vast accumulations of river deposits, scarcely raised above the level of the sea, and in some places defended from inundation by artificial means. I have already described this soil, from Holland to Denmark. On the Vistula we find vast tracts of alluvial land, constituting the plains of Marienburg and Thorn—celebrated. It is from these plains, and from the Polish provinces under Austria and Russia, that the granaries of Dantzic are principally supplied.

The eastern portion of the great plain which stretches into Russia presents a feature of peculiar interest, which has been minutely examined and described by Sir Roderick Murchison. Covering the drift which we have described, and other unconsolidated strata, is a layer of black earth, varying from a few to 15 or 20 feet in depth: it is scattered over extensive districts in middle and southern Russia, and is invariably the superior deposit. Sir Roderick describes it as unquestionably the finest soil in Russia; so fertile as arable land, that the farmers never apply manure, enormous piles of which, the accumulations of ages, are seen behind most towns and villages. "There are," continues he, "extensive tracts where no plough has yet broken in upon this fine virgin soil, and where it still is loaded with the richest crops of grass." *(Jour. Roy. Agr. Soc.* vol. iii.) "Murchison speaks of the whole taken together as occupying the centre of a trough large as an European empire." *(Quarterly Review,* March, 1846.)

I must now wind up this lecture; you will perceive that I have not described the soils of some countries. The British Isles would require a separate paper to do justice to the subject. Spain, Portugal, and Italy are politically dead, though the breath of life appears again to hover over and agitate that corpse where the lines of beauty still linger—prostrate Italy. I have said nothing of the pine-clad hills of Norway and Sweden, or the swamps of Finland; but as far as it could be compressed into a single lecture, I have sketched the physical aspect of the surface, with the origin and composition of the soils which call forth the energies of our continental neighbours, and over whose yet undeveloped powers science now hovers, waiting with benevolent hand to direct the exertions of the enlightened agriculturist.

ON TENANT-RIGHT.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—I have been much interested by several articles which have appeared in your valuable Journal on "Tenant Right," a subject which I confess I did not previously understand, having never before given my attention to the question. Being now convinced of the desirableness and justice of a fundamental alteration in this particular of the relations of landlord and tenant, and hoping that the expression of the views of one who comes fresh to the conflict, whose mind has not been warped by old prepossessions on the subject, and whose interests, moreover, are more with the landlord than the tenant, may not be utterly valueless, I hope you will allow me to offer a few remarks on the matter.

It appears to me that the most simple, feasible, and just method of allowing due compensation to the tenant for *non-removable* improvements, is for the landlord to pay the tenant, at the end of his tenancy, (or at the end of one lease or term of agreement, if a fresh agreement as to the rent be made,) for the increase in the value of the land attributable to his management; the tenant of course, on the other hand, to pay to the landlord, if the land from his management, or rather *mis*-management, be deteriorated. And as to the removable improvements, they, of course, should belong to the tenant, to take away or sell to the landlord, or any one else, as he may choose.

I find, at page 568 of your December No., that this plan and another are treated of; and it appears that the committee of the "Society for the Improvement of the Law" are of opinion that there are difficulties which are sufficient to render such a plan inapplicable, although it is confessed to be "obviously the just, and the only strictly just, method."

But I must say the statement of the arguments which actuated the committee only makes me the more persuaded of the superiority of the simple plan which at first occurred to me.

As to the first objection, surely the accurate valuation of the land at the *commencement* and *end* of the tenancy would be attended with no great difficulty; and as to the second, I cannot but think that, in almost every case, the improvements which may have been caused by extraneous circumstances may be easily distinguished and separated from those made by the tenant. For, if the proximity of a new town, road, canal or railway, alter the value of the land, yet its state and capabilities before and after the tenant's occupation could be compared one with the other, without for the time taking into account any of the above circumstances. It would be only the simplest act of mental abstraction in the appraiser: if the land were worth say £2 per acre at the commencement of the occupancy, what is it worth now at its termination, without reckoning the additional £1 say, per acre, which that and other neighbouring estates have increased in value by the railway &c. that has been in the mean time constructed near at hand? And if any improvement had been made by the landlord, as is frequently, I believe, the case in this part of the country, that too could be allowed for. I cannot see wherein would consist the difficulty of estimating these allowances, or, at all events, any difficulty at all commensurate with those which beset the second system of the landlord paying "the prime cost of the works, subject to a proportionate deduction for subsequent enjoyment by the tenant"—difficulties which are very well pointed out in the above-mentioned statement of arguments by the committee: the obvious injustice of the landlord paying for all that the tenant may have laid out in improvements, whatever may be their ultimate value, when he takes the land again into his own possession, is, I think, quite sufficient to quash any such scheme.

But there is yet another all-powerful objection, it seems to me, which is not stated in the report, to allowing the prime cost of improvements to the

tenant, viz. How can it be ascertained what improvements are to be paid for by the landlord? for how can he tell exactly what items of the tenant's management, what degree of manuring &c. were necessary to keep the land in as good a condition as when he let it to him, except by the result?

Now, in the system of due remuneration which I would advocate, there can be no difficulty of this kind; it is fair for both parties—for the tenant, inasmuch as that not only new drains and other constructions would increase the amount of remuneration due to him as far as they were efficacious, but also every single pound of manure he might apply, even if he could not reap the benefit of it in the crops, as assisting to raise the value of the land above its original standard, would yet be remunerative to him; and fair also for the landlord, because he would have to pay for nothing except what would be of positive advantage to him in the increase of value to his estate, and consequent additional rent which he would thus be justly entitled to expect from the succeeding tenant. And the objections which seemed to puzzle the Bridgwater meeting, reported in your same number as referred to above, would also, I think, be entirely obviated—the objection, on the one hand, of the landlord being compelled to improvement whether he would or not; or, on the other hand, of the tenant being restrained from due and necessary improvements. But few landlords would be unwilling to pay the real value of improvements when effected; and the knowledge that *only the actual value* of such improvements, not the expense of them whether they be efficacious or not, would be refunded to them, would act as a wholesome check on the too rash enterprise of tenants.

I have thus endeavoured to explain that view of the adjustment of the "tenant-right" which I cannot but think will bear the test of public consideration and actual experiment, though I feel that I have very imperfectly and inadequately treated the subject; but if I have said enough to impress the "Looker-on," or the gentlemen of the Bridgwater meeting, or any other of your numerous readers, with this view of the subject, and induce them to elaborate the argument to the world in a clearer and more able manner, I shall not have written in vain. Hoping this may be the case, I would subscribe myself, Your obedient servant,

ANOTHER "LOOKER ON."

Bridport, Jan. 28, 1848.

CULTIVATION OF FLAX.

Being anxious to avail ourselves of every source of information calculated to throw a light on the subject of flax cultivation, we postponed, at the request of Mr. MacAdam, some remarks which we had intended to offer upon it, until the result of an analysis then making by Dr. Hodges should be made known. Having received from Mr. MacAdam a copy of Dr. Hodges's paper read before the Royal Flax Society of Ireland, we have inserted it in another column, and shall proceed to offer some observations upon it.

No advocate of flax cultivation, whose opinion is of any value, has attempted to deny that flax is an exhausting crop. In support of this assertion, we quote the following extract from Mr. MacAdam's prize essay referred to on a former occasion. Mr. MacAdam says:—

"The first and great objection urged against flax is, that it is an exhausting crop—that it derives a large proportion of organic matters from the soil, rendering it unfitted, without manuring, to bear other crops luxuriantly. *Per se*, this is quite just, as flax does abstract a larger amount of nitrogen from the soil than many other crops commonly cultivated in Great Britain. In practice these evil effects having become manifest, led landed proprietors to insert clauses in leases, prohibiting the cultivation of the plant. But if we consider the mode in which the plant was managed, we shall find that everything was taken off the land, while nothing was returned to it. The flax was pulled and steeped without the separation of the seed, which of course went to utter loss, and no portion of the water containing the decomposed matter so rich in nitrogen, nor of the refuse stems, was economised for manure. It is therefore not to be wondered at that flax culture got into discredit, and was prohibited, more especially when peace brought the large supplies from Russia into our markets, and reduced the prices obtained in war time for this material. But at the present day, by the introduction of the careful system of our Continental neighbours in the manufacture of the crop, attention to the saving of seed and its use for feeding cattle, and the striking analyses of Sir R. Kane, making known to us the value of the refuse parts of the plant, this objection has been completely set aside. If the fibre be composed chiefly of the elements of the atmosphere, secreted by the plant during its growth, and then assimilated, it of course becomes manifest that the restoration directly of the steep-water and woody stem to the soil, and of the flax-seed in the form of manure, after it has added to the farmer's profit by the nourishment of his stock, will completely renovate the land, and leave it as well fitted to produce any crop as before the growth of the flax."

Again, Mr. MacAdam, after giving an analysis by Sir R. Kane, says—

"Sir R. Kane reasoned from this analysis that, 'restored to the soil, the steep water should give back all that the crop of flax has taken from the soil; and thus, the valuable fibre being generated by the atmosphere, the great source of expense in the cultivation of the plant will be removed.' The quantity of nitrogen, phosphoric acid, potash, magnesia, and lime taken up by the flax plant from the ground *renders it a highly exhausting crop;* but if the above analysis be correct, the conclusion may be safely drawn that, as the great mass of these substances is found in the steep water, with a portion also in the woody part of the stem, and as the pure fibre is generated at the expense of the atmosphere alone, if the refuse parts of the plant be returned to the soil, the exhausting effects of the crop are of course completely neutralized."

Here, then, are two most important propositions upon which the merits of the question in a great measure, if not altogether, depend.

First, that the pure fibre is generated at the expense of the atmosphere alone.

Secondly, that the great mass—it is elsewhere said nine-tenths—of the valuable substances abstracted from the soil are contained in the steep-water. As regards the first of these propositions Dr. Hodges states in the paper referred to above:—

"Some time ago I communicated to this society the results of an analysis of the fibre of the flax plant, which proved that that part of the plant *was not, as had been generally supposed, destitute of matters derived from the soil,* and consequently that *in selling dressed flax the farmer disposed of some of the materials which gave fertility to his fields—of some of the earthy and saline matters which had enabled him to produce flax;* and that sound husbandry required that these substances should be returned to his farm."

He further states that his investigations during the past year have confirmed him in the opinion, "that in the ordinary flax of commerce a larger amount of inorganic matters (that is, matters supplied by the soil) would be found than in the beautiful prize specimen of fibre employed in his earlier analyses. In the *scutching tow,* which is also sold off the farm, he found a *considerably larger per centage of the matters of the soil than in the dressed flax.*"

We should like to know whether the prize specimen alluded to was from plants, the seed of which had been permitted to ripen, or from flax pulled in a green state. Here, then, is not only proof of the incorrectness of the statement, that "the fibre is generated by the atmosphere," but a positive assertion that a considerable quantity of inorganic matter is taken up from the soil by it.

As regards the second proposition, having reference to the steep-water, Dr. Hodges says:

"I believe that it would be going backward in agricultural science to teach the farmer that, if he would keep his field in good condition, if he would obviate the exhausting effects of the flax crop, he must apply the water in which the flax had been steeped—cart, at great expense, generally from a most inconvenient position, a liquid of so great bulk, of such varying composition, and which (as, from your reports he is directed to allow a stream of water to run over the hole, to carry away impurities, that is, a portion of the matters derived from the flax) could not possibly contain all the materials which the water had dissolved from the plant."

Dr. Hodges quotes Professor Johnston in support of his view:

"The conclusion at which Professor Johnston has arrived is, that, suppose the flax steep-water to be returned to the land, and even the scutchings also, which is rarely the case, 'the fibre as it comes from the mill, and even as it goes to market, would still carry off a considerable quantity of valuable matters from the soil.'"

Dr. Hodges gives an analysis of the contents of the steep-water, and states it as his opinion, that it would not pay the farmer to cart the steep-water to the land. He further remarks—

"Flax is an exhausting crop; that is, like every plant that is cultivated for food or clothing, or that springs up along the highway, it takes, during its growth, certain matters from the soil. When only a part of a plant, as with the wheat and other crops, is sent to market, only a part of the matters of the soil is lost to the farm, and its exhaustion is delayed; but, under the system of management which, I am sorry to say, even yet prevails in many parts of this country, it is impossible that the growth of flax should not injure the land. Every part of the plant is lost to the farm. The bolls and stems and roots are placed in the retting-hole; and the shows are seldom returned to the soil. It therefore becomes absolutely necessary that, like the first flax-farmers in the world, the Belgians, we should restore by manure all that the plant has taken away."

Now, it naturally occurs to us to inquire how it happens that "the first flax-farmers in the world, the Belgians," should not have adopted the improved management so frequently alluded to, and so much relied upon. In no country in the world is the economy of manure better understood than in Belgium. Why, then, do they find it necessary to apply a large quantity of the very best manure that can be obtained to the land intended for flax?

Dr. Hodges gives an analysis, to show that the flax "takes away, per acre, a less amount of valuable ingredients than either the turnip or the potato." To this statement no importance can attach. It is admitted that the potato is an exhausting crop, requiring large quantities of the best manure; the turnip is wholly returned to the soil. Dr. Hodges concludes by observing—

"If we apply a proper manure to the soil, and the

flax bolls be used for feeding, and thus added to the manure heap, all the mineral ingredients which the crop takes away may be perfectly restored, and the exhausting effects of the cultivation of the plant removed, without the necessity of having recourse to the generally impracticable methods which have been insisted upon as necessary for that purpose, but which, I have shown, could not give back all that the plant takes away."

The "proper manure" which the Doctor recommends is a compound, the ingredients of which he sets forth, and which may be obtained at a cost of 11s. 6d. per acre. These compounds have not however as yet been found to be eminently successful.

We should much prefer following the practice of "the first flax-farmers in the world," and which will be found in an article in the "Highland Society's Journal," of October last, but which involves the application of a liberal quantity of manure of the very best quality.

Dr. Hodges has destroyed the theory of Sir R. Kane, and has put an extinguisher on the new lights of flax cultivation.

ROYAL FLAX SOCIETY.

At the meeting of the Royal Flax Society Dr. Hodges read the following paper:—"Having been requested by the Committee of the society to undertake some investigations with respect to the composition of that part of the flax plant which is employed for manufacturing purposes, and the effects which its production exercises upon the soils of this country, I will now, sir, with your permission, lay before the meeting the results of some of my researches. Though, in the course of inquiry which I have marked out for myself in this investigation, I have, as yet, only advanced a short way, the results already attained are of considerable practical importance, and will therefore, I conceive, be interesting to the friends of flax cultivation. Most of those present are probably aware that some time ago I communicated to this society the results of an analysis of the fibre of the flax plant, which proved that that part of the plant was not, as had been generally supposed, destitute of matters derived from the soil; and, consequently, that in selling dressed flax the farmer disposed of some of the materials which gave fertility to his fields—of some of the earthy and saline matters which had enabled him to produce flax, and that sound husbandry required that these substances should be returned to his farm. At the time that investigation was made the public were not in possession of any complete analysis of flax fibre, and we possessed only a single analysis, by Sir Robert Kane, of the entire straw of the plant. I have during the past year examined many samples of flax fibre from various parts of Ireland, and the result of these investigations confirmed the opinion which I had expressed to the society, that in the ordinary flax of commerce a larger amount of inorganic matters (that is, matters supplied by the soil) would be found than in the beautiful prize specimen of fibre which I employed in my earlier analyses. In the scutching tow, which is also sold off the farm, I found a considerably larger per centage of the matters of the soil than in the dressed flax. In my report on the composition of the dressed flax my object was to show that, as in that substance certain matters of the soil were contained which were not restored to the farm, it was important that the composition of every part of the plant should be carefully studied, for the purpose of ascertaining, if possible, the precise effect which its growth produced upon our fields, and the most economical methods of maintaining their fertility. I believed that it would be going backward in agricultural science to teach the farmer that, if he would keep his field in good condition, if he would obviate the exhausting effects of the flax crop, he must apply the water in which the flax had been steeped—cart, at great expense, generally from a most inconvenient position, a liquid of so great bulk, of such varying composition, and which (as, from your reports, he is directed to allow a stream of water to run over the hole, to carry away impurities, that is, a portion of the matters derived from the flax) could not possibly contain all the materials which the water had dissolved from the plant; while all the materials which are required for the growth of the flax crop, or which it could take away from the soil, might with certainty be supplied in an economical and portable form, by means of substances at present well known to the farmers of this country. Since the publication of my report, I had the satisfaction of finding, in the new edition of the valuable lectures of Professor Johnston, of the Agricultural Chemistry Association of Scotland, that he entertains the opinions which I there expressed. He has also given an analysis of the fibre of flax, which, probably not having been so carefully managed as the sample prepared by Mr. Walker, of Tullygirvan, employed in my analysis, contained in the ash a considerable amount of alkaline salts; shewing that, even after steeping, some of the soluble salts of the plant may, in the fibre, be retained. The conclusion at which Professor Johnston has arrived is, that, suppose the flax steep-water to be returned to the land, and even the scutchings also, which is rarely the case, 'the fibre as it comes from the mill, and even as it goes to market, would still carry off a considerable quantity of valuable matters from the soil.' To examine what amount of the matters which the plant takes from the soil is usually contained in the water of a steep-hole, for the purpose of calculating whether it would pay the farmer to apply it to his fields, as recommended, I procured from an experienced flax-grower (Mr. Patterson, of Moneyrea) samples of the water supplying a steep-hole on his farm, and also of the flax infusion, or tea, as we might term it, taken from the hole immediately after the removal of the flax, which had remained in it for three weeks. I had a quantity of water which the hole contained carefully measured, and was therefore prepared to calculate the value of the liquid for manuring purposes. I found that it required 3,552

gallons of water to steep 88 stooks of flax straw, which were the produce of a statute acre; and my analysis shewed me that that quantity of water contained 32½lbs. of inorganic matters. The pure water, before the flax had been steeped in it, contained 5½lbs. of inorganic matters, so that only 27lbs. of the mineral ingredients, which the growing plant had taken up for its nourishment from the field, were contained in the water of the steep-hole. As the details of my analysis will, at another time, be presented to the society, I will now merely give you the amount of the valuable ingredients which were contained in the water of the steep-hole examined. In the calculation I have included the substances originally present in the water, as well as those derived from the flax, as both would, of course, be applied to the soil should the water be used for manuring. The water contained, omitting sand and other unimportant matters—

Potash	7.7 lbs.
Chloride of sodium (common salt)	1.6 "
Chloride of potassium	3.5 "
Phosphoric acid	1.7 "
Lime	7.0 "
Magnesia	2.7 "
Sulphuric acid (vitriol)	1.7 "

You can easily calculate how much it would cost to pump the 3,552 gallons in which these ingredients were dissolved, and to cart them to your fields, over the hills of Down and Antrim; and will, I think, agree with me, that, if they could be restored by means of a manure which would cost only three or four shillings, it would not be worth your trouble. Now, chemistry shows us that not only these mineral matters, but also the organic matters, dissolved in a steep-hole, of the same composition as that which I examined, may be placed on the field of the farmer for less than four shillings. I would now direct your attention to an important question, which has of late excited considerable discussion, both in this country and England, viz., with respect to the exhausting effects of the flax crop. This question I hope to test carefully in the present year, not merely in the laboratory, but in the field. It appears to me that in the discussion of this subject, both the advocates and opponents of flax culture have, as is frequently the case, expressed themselves too strongly—one party, impressed with the conviction of the great importance of the plant to this country, contend that it is not an exhauster of the soil; while those who have opposed themselves to its extended cultivation attempt to terrify farmers and landlords by their statements of the 'scourging' effects which it produces. By their language you would suppose that in the flax plant there was something peculiarly injurious to the soil—something which caused it to exhaust the land more than any vegetable that we cultivate. Such notions have been produced by the want of knowledge of the connection which exists between our crops and the soils in which they grow. Flax is an exhausting crop, that is, like every plant that is cultivated for food or clothing, or that springs up along the highway, it takes, during its growth, certain matters from the soil. When only a part of a plant, as with the wheat and other crops, is sent to market, only a part of the matters of the soil is lost to the farm, and its exhaustion is delayed; but under the system of management which, I am sorry to say, even yet prevails in many parts of this country, it is impossible that the growth of flax should not injure the land. Every part of the plant is lost to the farm. The bolls and stems and roots are placed in the retting-hole; and the shows are seldom returned to the soil. It therefore becomes absolutely necessary that, like the first flax-farmers in the world, the Belgians, we should restore by manure all that the plant has taken away. Though I admit that flax is an exhausting plant, in the proper sense of that term, yet my analyses and calculations show me that it does not rob the soil half so much as some of the most favourite crops of the farmer. I have prepared some tables, which will enable you to understand this statement. The flax plant referred to in the calculations was grown in the north of Ireland. I will give you the amount of phosphoric acid and alkalies contained in a hundred parts of the ashes of the stems of that plant, compared with that afforded by some of our ordinary crops.

One hundred parts of the ash of the following plants contain

	Phosphoric Acid.	Potash and Soda.
Flax	7	12
Wheat-straw	3	13
Oat do.	3	29
Bean do.	7	55
Red clover	8	36
Cabbage	12	32
Potato-stalks	7	44
Turnip-tops	9	34

It appears, therefore, from the above table, that a hundred pounds of the ashes of flax straw contain a larger amount of phosphoric acid than the ashes of the straw of wheat and oats, the same quantity as the ashes of bean straw and potato tops, but not so much as is found in the ashes of the cabbage, of turnip tops, or of red clover. This plan, however, of comparing the exhausting effects of these crops—though it has been adopted, in some of the discussions on this subject—is not the most instructive way for the farmer to look at the question. It is only when we consider the amount of the valuable matters of the soil, which the ordinary produce of the usual crops takes away from an acre of land, that we can judge of the effects which their production must exercise upon the stock of matters contained in the soil, and, consequently, the degree of exhaustion which they occasion. The ordinary produce of one statute acre of the following crops takes away from the soil:

	Total.		Phosphor. acid.		Potass.	
Flax straw, two tons, yield, of inorganic matter	224lbs.		contain 15½lbs.		144lbs.	
The tops of 12 tons of potatoes	270		20½		77½	
The tops of 25 tons of turnips	387½		36		111	
Six bushels of flax bolls, dried, weigh 960 lbs.	48	272	18	33½	11	254
The ash of the straw	224		15½		143	
12 tons of potatoes, stalks and tubers	870		96		409	
25 tons of turnip tops and bulbs	812		68		289	

It appears, therefore, from the above table, that the ordinary produce of flax takes away, per acre, a less

amount of valuable ingredients than either the turnip or the potato. If we apply a proper manure to the soil, and the flax bolls be used for feeding, and thus added to the manure heap, all the mineral ingredients which the crop takes away may be perfectly restored, and the exhausting effects of the cultivation of the plant removed, without the necessity of having recourse to the generally impracticable methods which have been insisted upon as necessary for that purpose, but which, I have shown, could not give back all that the plant takes away. Now, a manure for this purpose may be cheaply prepared, and, after an analysis of the plant, I consider that all the inorganic matters which two tons of flax straw remove from the soil might be replaced by the following compound:—

	s.	d.
Muriate of potash, 30lbs., which cost about	2	6
Chloride of sodium, common salt, 1 cwt.	0	3
Burned gypsum, 34lbs.	0	6
Bone dust, 54lbs.	3	3
Sulphate of magnesia (Epsom salts), ½ cwt.	5	0
	11	6"

Doctor Hodges then proceeded to show, that, in this part of Ireland, by the use of kelp, a manure might be prepared at even a cheaper rate.

REMARKS ON MAIN'S PAPER ON SPECIAL MANURES.*

It was my first intention to have used very strong expressions in commenting on this paper, nor was this feeling overcome until arriving at the close of the report, where the writer states that what he has done is "only the effort of a mind in a measure unaided," and expresses a wish that "if his conclusions or suggestions are erroneous, and be considered worth the trouble of being confuted, he will be happy to be convinced of his error." This candour somewhat abated the impatience felt at seeing an important agricultural question smothered beneath such a mass of ill-directed labour.

The writer confesses himself to be without chemical knowledge. Without this confession the following extract would be sufficient to show his misfortune in this respect. After stating that a mixture of saltpetre refuse and animal charcoal did not produce any good effect, the following reason is assigned for the failure:—

"As already named, the weather was extremely hot when the substances were applied. Now saltpetre is naturally damp, and when in combination with animal charcoal it becomes damper, is it not possible that a damp substance exposed to a high temperature may lose part of its gases."

This, it will be remembered, is ushered into the world under the auspices of one of the leading agricultural societies of the kingdom. Any one acquainted with chemistry must know that saltpetre refuse contains no gases which anything short of a red heat will drive off.

The writer appears to think night-soil and shells, mixed, a very useful *specific*; and yet in one of the trials the mixture failed, the reason for which is suggested to be the "amount of carbonate of lime and magnesia present in the soil." Any work on chemistry would have informed him that shells are nearly pure carbonate of lime.

These extracts may show how completely the writer was unfitted in one respect for his task. In every other point the paper is highly creditable; more especially so far as labour in weighing and calculating is concerned. Unfortunately the want of the first has rendered the whole useless.

I am sorry to say the paper is not a solitary instance of the waste of time and labour which results from a want of system in these inquiries.

So far from combating any of the writer's conclusions, there really is not one in the whole paper! except it be with regard to guano, the value of which has been established for several years.

Besides the above there is nothing in the whole paper which the writer seems to think has repaid him so well as saltpetre refuse; which consists of (principally) muriates of the alkalies and earths. Most strongly is the farmer to be cautioned against expecting continued good crops from the use of such a manure. An average crop of grain removes from the soil—

Potash	35 lbs.
Soda	4 „
Lime	15 „
Magnesia	9 „
Phosphoric acid	20 „
Sulphuric acid	6 „
Chlorine	2 „
Silica	114 „
Ammonia	40 „

It may, therefore, be laid down as an axiom in practical agriculture that, as these ingredients are removed from the soil, they must be returned to it, if permanent fertility is to be maintained. That, therefore, is the best manure which contains the above-mentioned substances in greatest abundance and in the proper state for immediate assimilation by the plant. How then, I would ask, is a good crop to be expected from the *specifics*, as they are called in the paper before us? It is but useless labour to prosecute the inquiry in the manner hitherto done. Chemistry having, as above remarked, shown the component parts of our various crops and our manures, at the same time pointing out to us where the salts, minerals, earths, &c., composing them can be found—for instance, phosphoric acid in bones, guano, or apatite, chlorine in salt, &c., &c.—it only remains for us to ascertain the proportions and state of chemical composition in which these various matters may be least combined, so as to give the best possible produce by their application. The time cannot

* Journal of Agriculture, Jan. 1848.

be far distant when a knowledge of chemistry will be thought an essential part of the education of a farmer, or at least of every experimenter on manures.

To conclude, we deprecate every personal feeling towards the writer of this report, the only motive being to point out the loss of time, talent, and labour involved in the publication before us; in which, for want of the question being put in a proper form, there is not one scrap of information either positive or negative.

Believe me, sir, yours, &c.,
C. E. D.

P.S. Since the above was written, I am enabled to lay before you the following analysis of saltpetre refuse.

Nitrate of Soda	trace
Chloride Potassium	3.54
Chloride Sodium	89.28
Water.....	6.25
Insoluble	trace
	99.07

In other words, 90 per cent. of common salt, which is estimated in the report at 13s. per cwt. That salt is of very limited use as a manure is now well known; and certainly there can be no better comment on the value which is set on saltpetre refuse in the report, than the above analysis.

FINLAYSON'S HARROW.

Sir,—The catalogue of agricultural implements does not contain a tool of more effectual value than the triangular harrow, or grubber, which bears the name of the inventor. In the working of all turnip lands, and the more friable clays, one process of its operations is much more useful than two or three ploughings; both for the purpose of raising the roots of weeds, and in pulverizing the soil. The round or triangular tines carry along without tearing or cutting the couchy roots, and the points of the tines being bent forwards raise and break the soil to a very considerable depth. It is used in the county of East Lothian in the south of Scotland very extensively, and with very great benefit. In that county the turnip soils are clayey loams, and the wheat lands are friable clays, and both kinds of soil admit the use of the grubber now mentioned, in the largest extent. The farmer is thus relieved from the not uncommon perplexity of having to provide different implements for working different soils; and not unfrequently the unavoidable dilemma occurs, of having to attempt to cultivate stubborn soils with unsuitable implements. But experience has now most fully established the great value of Finlayson's harrow on all loamy and moderately friable lands; and it is proposed that all turnip lands be wrought and got ready for being sown by means of that implement alone.

The first furrow, or the winter ploughing, must be given as usual, and so deep as the humified stratum of the soil will allow. In the spring the grubber works across the furrows, and then lengthwise, when the harrow and the roll will be used in the common way. After each gathering of the weeds the grubbing is repeated till the land be cleaned, and the soil pulverized, and ready for being sown.

It is very evident that this mode of preparing turnip lands will retain the moisture much more closely than by ploughing, which in each process turns up and exposes the under soil, which has gathered moisture by being hidden from exposure. In dry seasons the whole depth of the moved stratum is completely dried up, and becomes wholly devoid of moisture, on which the success of turnip farming so very much depends. The Scotch mode of drilling, or forming the land into ridgelets, is very objectionable, in exposing the land so often to the scorching suns on the arid soils of south Britain in the process of working and drilling; and sowing the turnips on the flat surface is preferable. The grubber now mentioned moves and works the soil, and catches and raises the roots of weeds, without turning up and exposing the land to sun and drought; a close surface is presented by the harrowing and rolling, and which is of incalculable advantage in guarding against the evaporation of moisture.

This suggestion is most worthy of the attention of enlightened practical men: the mode of applying the dung for turnips, in conjunction with the working of the land by the grubber, will form the subject of another notice. D.

Agricultural Institution, Hoddesdon, Herts, Jan. 17.

HEREFORD FARMERS' CLUB.—At the general meeting of the members, on the 12th inst., the office-bearers of this club for the following year were appointed as follows:—Chandos Wren Hoskyns, Esq., Chairman; Marcellus Newton, Esq., Vice-Chairman; Mr. John Kerr Hastings, Treasurer; Mr. J. Head, Librarian; Mr. W. H. Apperley, Secretary; Committee, Mr. T. W. Maddy, Mr. W. Racster, Mr. J. Jancey, Mr. T. Cranstone, J. G. Freeman, Esq., R. M. Lingwood, Esq., and Mr. H. Heywood. The following list of subjects to be discussed was agreed to:—Feb. 26, How far a well-regulated system of "Tenant-right" would be beneficial to landlord and tenant; the best method of draining; also, the best method of consuming summer green crops. May 27, How far deep ploughing and subsoiling are beneficial, as regards the soil of the county of Hereford. Aug. 26, The best method of producing autumn green crops after stubbles, as mustard, &c.; also, the cultivation of the carrot. Nov. 25, Upon rotation of cropping. Second Wednesday in January, 1849, General meeting. We are glad to be able to state that the funds are in a flourishing state (if members would but pay up the arrears of subscription). The usefulness of institutions like this is now so generally acknowledged that we need say nothing on that score. The library is a particularly important feature of this club, periodicals costing £10 per annum being by its means placed within the reach of every one for perusal, at the trifling annual subscription of five shillings.

SOCIETY FOR THE AMENDMENT OF THE LAW.—TRANSFER OF LANDED PROPERTY.

JAN. 25.—Mr. James Stewart delivered his second lecture "On the means of facilitating the transfer of land," at the rooms of the society, 21, Regent-street.

Mr. STEWART commenced by showing the inapplicability of the system by which land was transferred, to the transfer of any other species of property. He then showed that the inquiry into title was in many cases dispensed with, without any injury or inconvenience; and that the profession themselves frequently made efforts to avoid it. He thus described the remedy which he proposed:

I propose, then, the establishment of a register of all the lands in this country, which is to be divided into districts for this purpose, of a smaller or greater extent, as may be thought most advisable. My own idea is, that these districts should follow pretty much the boundaries of the districts of the county courts, and that the officers of those courts should to some extent be available for carrying on the functions of the register. I would establish a register in each of these districts; but I do not propose that it should be compulsory on any owner of property to register his land until some transaction respecting it took place. I would accompany the establishment of the register by the taking of an accurate map of the whole lands in every district, which should be identified in all its particulars by numbers, but which as to boundaries or ownership should not be evidence until acted on, and when acted on be only evidence against the person who so acted on it, but not as against any one else. This map, to which I shall hereafter refer, would take time to complete; but I do not propose to wait for its completion before establishing the register, which might commence immediately with the existing description of the lands, and such identification of the parcels as could be obtained, which might be rendered complete when the map was finished. In this way, and by degrees, the lands in each district would gradually get on the register; and I think it would be only reasonable to allow persons to place their lands, after some public notice, on the register, if they thought proper, although no dealing took place. I propose that a certain effect should attend the undisputed placing and continuance on the register for a certain number of years. We have seen that the present law makes 40 years', and in some cases even 20 years' adverse possession a title against all the world. As placing a title on the register would be a more public act than any deed can now be, I think it would be reasonable to attach to it a more stringent operation, and I should say that a person having registered his land for 20 years should hold it against all the world, giving 10 years more for persons labouring under disability to make their claim. After 30 years remaining on the register, a complete title would thus be acquired. But, supposing a person had some claim to this land, I would allow him to enter this also, by way of caveat. This person need not further prosecute his claim unless he wished, but no dealing with that land so claimed should take place until that caveat had been removed. But then I would protect the true owner, by imposing penalties in proportion to the value of the land on any vexatious or frivolous claim.

I should here explain that I think it absolutely indispensable to the successful working of the plan, that at the head of each district should be placed a person having a knowledge of the law of real property, against whose act there should be an easy appeal; and that he should regulate all the transactions within his district; and to some given number of these registrars, say five, I would give powers of securing uniformity of practice, by issuing regulations from time to time. The form of the register should, I think, resemble that which is contained in this model of the Belgian Cadastor. It should contain the number on the map (when that was completed), and the name of the proprietor.

Now, gentlemen, questions would no doubt arise, although I do not think they would be so frequent as may be supposed, as to claims to be placed on the register. I would not oust the jurisdiction of the superior courts as to these matters; but if all parties chose to submit such matter to the registrar himself, he should have power to make a final adjudication as to them. Where property lay in several districts, the decision in such cases should be made by the several registrars of these districts sitting together; and in all matters not so submitted to the registrar, his acts should be subject to appeal.

When once entered on the register, all the dealings and transactions respecting the land, the title to which was so entered, must afterwards appear to be valued, but with this distinction from the present practice. Our present plan perpetuates all those dealings which have taken place, as I have said, for the last 60 years; and although they have been long discharged or wiped out, they still appear on the abstract. Thus, once a mortgage always a mortgage; and both the original deed, the various transfers that have taken place, and the reconveyance of the mortgage debt, all load the abstract. This will be unnecessary on the plan that I propose. As a debt is paid off, it will disappear entirely from the register. This is the practice of many existing registers. I find it most readily in the Prussian register; I have here a copy of the register. At p. 116 I find the entry of a mortgage for 12,000 dollars, and a few pages after is the discharge of a part of it, and so on, so that the exact state of the existing burdens on any part of the land may be easily shown, and that is all the purchaser wishes to know. There will be more difficulty

with our settlements, for, of course, I propose no restriction as to them. The charges under them remain a long time as burdens on the land. The portions of children are not always paid off; they often allow them to remain on charges, and they are settled on marriage, and perhaps three generations must pass away before all traces of this deed can be wiped off. This, doubtless, would remain as at present; but it would not be at all more troublesome to produce the necessary evidence of the discharge of all claims under it. That settlements are compatible with a register kept on this principle, is proved by that of Prussia (Proper) and other countries where the law of primogeniture obtains, and settlements on younger children are made. But, gentlemen, there is no wish, of course, to transfer an estate liable to charges, except subject to those charges. The advantage of the system to which I now refer is, that under it the title works itself free, and that if there are no incumbrances this at once appears; whereas, according to the present system, a person so situated has as much trouble, delay, and expense in transferring his land, as a person having an encumbered estate.

One word as to the publicity which has been always a great objection to a register. There is a celebrated declaration made by the most eminent bankers and merchants of London to be found in the Appendix to the Second Report of the Real Property Commissioners, in favour of the utmost publicity, and declaring their opinion that it would be of the greatest benefit. It is also found to work no inconvenience in the many countries where a register prevails, open to the inspection of any one for a small sum of money. And in England it exists as to personal estate, for every one for 1s. may inspect any will that he pleases at Doctors' Commons. Still, if this be thought an insuperable objection to a register, it might be guarded against by having the land vested in a legal owner, and a simple reference to the mortgage or settlement containing those provisions which it was thought advisable to conceal. But this is matter of detail.

Now, by this plan of a register, which I propose slowly and gradually, or, if the parties please, as quickly as they chose, all the lands of this country would get on the register, which would ever afterwards be evidence of the title, and would, in no distant period of time, give the owners a complete title against all the world.

I may here say, gentlemen, I trust without offence, that I greatly lament the recent alterations in the law, which prevent parties by any act of their own acquiring a title of this kind. The period of time at which this might have been done by fine and non-claim was, I quite admit, too short; but I think it highly desirable and convenient, on many occasions, to give this operation to some solemn act, by the owner of the estate, after a certain time, say 20 years, has elapsed.

The wisdom of our ancestors, which no one but a very inconsiderate person can dispute, provided for thus clearing defective titles, not only by a fine, but by a feoffment, which had the effect of divesting all estates; but this operation, so far as both are concerned, has been done away with by recent acts.

So far, then, as to the plan of registry that I propose. But there is one great practical difficulty with respect to this and all other plans of registry. It is this. It can only come, without some violent act of the legislature, into complete operation after a considerable lapse of time. It is true that the moment the land is placed on the register the owner gains this security, that all after dealings with it must there appear, in order to be valid; but many years must elapse—20, 30, and 40 years—before all investigation into the title previous to the entry on the register can be dispensed with.

I have, indeed, seen it proposed that, in order to hasten this slow operation of a register, there should be some general examination of titles throughout the country; and it is quite true that, on the first institution of the Prussian register in 1783, there was such an examination, extending back for 43 years. I will not say that this would not be tolerated in England, but it certainly would excite great alarm; nor do I think we need resort to it. It would certainly be a great thing to have all titles declared good by some formal proceeding, and thus start afresh; but, in doing this, having any pretension to justice, or regard to the rights of property, you would call up many dormant, unsubstantial, and imaginary claims to property; and, in attempting to settle, you would, in fact, disturb titles to a great degree. I recommend no such course. Another plan, recommended by better authority is, that the registrar, before placing a title on the register, should himself look into the title, and give his opinion on it. This would be a far more practical plan—be acting as a master in chancery now does. But even here, if this were to be an effectual examination, it would be exceedingly difficult to quiet titles without recourse to very harsh measures towards absent parties, or calling up many questions which it would occupy much time satisfactorily to dispose of. I do not say that this latter plan would be impossible, but I think that in practice it would be attended with difficulty, nor could it fail to excite some uneasiness throughout the country.

Is it possible, then, that the benefit of the register can be realized immediately, without these disadvantages? Can any means be devised, by which a living person, wishing to buy land, shall be satisfied with the investigation which he there may make, without raking up the old title? for that is the point to arrive at. If not, many existing owners, I fear, will look but coldly on any plan of registry, the benefit of which is almost entirely prospective, and intended chiefly for the good of others. The doubts surrounding the question, the fears of disclosure, will press on them, and they will look, at all events, with no great desire on a scheme in which no immediate benefit is afforded to themselves. And yet I need not tell you, that it is by the existing owners of property that any act of registry must be passed. Can we then satisfy this all-important class, that they may derive immediate benefit from the register, and that it will greatly facilitate the transfer, not only of the property of their successors, but of their own? Gentlemen, I think it is possible to secure this great advantage, by a method which will enable the existing owners of

property to deal with their lands without the constant retrospective deduction of title, which we have found to be so tedious and expensive, which will be attended with at least all the safety of the present system, and be much more speedy and cheap.

Gentlemen, I have already told you that the reiterated investigation of the title usually required by the present practice, is the great cause of that expense, and delay, and risk. Now, it certainly would be of immense advantage if, in connection with the registry of the land, there was one complete and final examination of the title which should answer once for all, and not attended with the disadvantages I have alluded to. Mark, gentlemen, on what security we now buy land, and lend our money on land. It is lent wholly on the faith of the counsel's opinion that "the title is a good one." And the soundness of this opinion is found very rarely to be disproved by the result; at all events, this is the only security ever taken. Suppose, then, that after a certain time, and preparatory to being placed on the register, the title of the lands in which a dealing was intended to be made was inspected by eminent counsel, selected for the purpose, and that this examination was to be a final one, preparatory to being placed on the register. This would be something. The purchaser would be informed that the examination had taken place, and that the title had been declared a good one by Mr. B. or Mr. C. Now, if this had just occurred, it might very probably satisfy a purchaser under the existing system. It would, therefore, be not too much to expect that the same examination would satisfy a purchaser under any new system. But we must make sure. Now, what is the proportion of good to bad titles in this country at the present time? I have heard it stated by experienced professional men, that for 99 good titles there is only 1 bad; and as to this, I find a very important passage in Sir Edward Sugden's book on Vendors, who says (Ed. 11, p. 986) in the last edition, "that the present expense as to titles is, in 49 cases out of 50, superfluous; but, as every one may be in danger, all are guarded against it. The precaution has very much increased within the last twenty years, but not from any increased danger." Well, then, according to this last very high authority, 1 title in 50 only is bad. Now, if this be so, and I believe there can be no doubt that a larger proportion than 49 in 50 are good, does not the principle of insurance apply? This principle, which is constantly receiving extension, and with great benefit, is founded on the fact that in a certain number of lives a certain number of deaths only will take place within a given time, or that in a certain number of houses only a certain number will be destroyed by fire, or that in a certain number of ships only a certain number will be lost; and on these calculations, some of the most profitable, easily conducted, and wealthy companies and businesses in the world, have been established. Now let us see whether it be not possible to extend the principle to the insurance of titles. Each of these different kinds of insurance had its battle to fight at the commencement; and do not let us reject this extension of the principle without careful inquiry. Now, I wish, in the whole of the procedure that I propose, as much as possible to abide by the present practice of conveyancing, and to act according to existing rules. I will assume, then, that one of our large insurance offices, in whose means and stability the public would have perfect confidence (and no other could do it at all), was willing to undertake assurances of this nature. Let us see what would be done. One source of the profits of these companies, as we all know, is lending out their money on mortgage. They have, therefore, a machinery for examining titles; that is, they take care to employ an able and experienced solicitor and conveyancer. Now, it is on the opinion of both these gentlemen that the company lend their money; they have no other safeguard. They advance their own money on the sole faith of this opinion, and sometimes very large sums indeed—on one title £100,000, £200,000, and even in a late case that came to my knowledge, £400,000 on the title of one person. Now, gentlemen, if they would lend their own money on such a security, it is most obvious that they could guarantee the payment of another person money, on a similar certificate by the professional adviser that the title was a good one. If they lent their own money on a title that turned out bad, they would assuredly lose it; and if it was another person's money they could be no worse off, and might possibly be better. All those titles, then, that are good, are susceptible of being insured, with only a sufficient protection, by way of premium (to be paid as I shall hereafter explain), against some one title in 50, or, as I think, a larger proportion, which might, in spite of every case, turn out bad, alike under the present as under the new system. So far you will see that we have adhered to the existing practice, and there is no shock done to any to favour, or, if you please, prejudice towards existing habits. But see what an advantage is gained. The person whose title has thus been approved goes with it to the register. The title is thus insured for what the land will fetch in the market. No further examination of title is necessary. It is an insured title down to the 1st of January, 1848, and were a register in existence, it is a registered title ever afterwards. If it remains a sufficient time on the register, it becomes a title against all the world, and the insurance is at an end; if, on the other hand, the purchaser has got the unlucky fiftieth title, the black sheep, and he is turned out, at all events he gets back the money that he has paid. In the meantime, for all purposes of sale or mortgage, there can be a ready dealing with the land.

But we have so far supposed that the title was of that class on which insurance societies lend their money; that is to say, marketable titles. Let us suppose that the title, when examined, turned out not a marketable title, but only what is called a good holding title; might it also be insured? Undoubtedly; because if the purchaser, although he had not what is technically called a marketable title, was not evicted, the company would be quite safe, although here, perhaps, a higher premium might be required. Here, then, are two classes of titles under which the great bulk of the present titles may be ranged—marketable titles and holding titles; and for this purpose you would thus get rid of this absurd dis-

tinction. What is to be done with a third class—titles more or less defective? What is done now when there is a willing purchaser? An indemnity is given against the defect, according to the nature of the defect—a bond, or covenant, or charge on other land, or deposit of money. Thus, the defective title is now cured. Cannot a company, acting in discharge of its proper duty, take an idemnity, as well as an individual? I have thus provided for all these three usual classes of titles. And what is to be done with positively bad titles? Can they be insured? Why, no; no more than the life of a man in a galloping consumption. They ought not to be transferred; and as to them, the holder has no title, and ought not to be protected. But all technical blots—all that class of objections which are called "conveyancers' crotchets," and most of those objections which private acts of parliament are obtained to cure, could be insured against with perfect safety. There would be an end of them for ever. Now, if this were done, do you not see what a mass of technical objections, which now effectually prevent the transfer of land, would be got rid of? An insured title down to a certain period, and a registered title ever afterwards, would give you indeed free trade in land, if this is what is desired, and would at all events allow the real owner to do what he wanted with it.

[After noticing in detail several objections which might be urged against this plan, Mr. S. proceeded:]

I have now laid before you the rough outlines of the plan. Do not imagine that I suppose it would be free from difficulties or from fraud. I can only say that in my opinion it would be infinitely more free from those than the present system, and that—

1. It would enable persons freely to deal with land, and that, by its means, we might obtain those advantages which I alluded to in my first lecture—1. Security of tenure; 2. Facility of transfer; 3. Certainty in point of time in all our arrangements respecting land; and, 4. A reasonable, moderate, and well-ascertained scale of expense attending our various dealings respecting it. These are what are wanted by the landowner—yes, and by the lawyer too; for I have shown you that many members of the profession are calling for these as necessary for carrying on their business. The plan, as I believe, would relieve the seller of land from his present difficulty and danger.

2. It would secure to the purchaser a safe title at a small expense, and in a speedy manner; and

3. It would provide an indemnity fund for persons who might be injured by any improper dealing under the new system.

There are some other important points connected with the plan, as to which I desire to say something more, and some other alterations which I think should accompany a register. To them I shall hereafter advert. But before I conclude the present lecture, I wish it to be understood that in performing this great change, I do not hold out any hopes of dispensing with the use of the lawyer in dealing with land. When the interest of the profession clashes with that of the public, it is the duty of the former to give way; but here, I believe, they do not clash; and it is as much the interest of the profession as of the public to promote the ready transfer of real property. I find this expressed on all sides by members of the profession, and more especially by solicitors, from many of whom I have received great assistance. I find in those countries in which registers are established on the principle for which I contend, that the professional classes who assist in those dealings with land, are a rich, powerful, and respected class. Without legal assistance, I do not believe that dealings in land can be safely conducted. I have no intention, because I think I have no power, of dispensing with their assistance. But I believe the charges may be made more moderate in this particular case, better defined, and regulated according to the amount of property; but believing, as I do, that if you establish a register on this plan there would be twenty dealings where there is now one, I am satisfied that the last person who would complain of this alteration would be the lawyer. It is not his real interest, be assured, to support a system which scares the great majority of the public from having anything to do with the purchase of land.

At the close, thanks were voted to Mr. Stewart for his able and interesting lecture.

APPLICATION OF FARM-YARD DUNG.

In a former paper it was proposed to prepare turnip lands for being sown by means of the operations of Finlayson's grubber, after the winter ploughing of one deep furrow. The purpose of this paper is to describe the mode of applying farm-yard dung, in accompaniment with that preparation.

We know enough of the nature of the food of plants to suppose that it must be in a state of solution and suspension, proceeding from minute sub-division; that water is the vehicle, and that the substances which the plants imbibe must be in a very comminuted state to be capable of being suspended in the common carrier. Similar observations have led to the preparing and cooking of food for animals and human beings; and though plants cannot show us so quickly and visibly, we may very reasonably suppose that they possess the instinctive faculty of choosing and rejecting; and we have this exposition made by them, of their growing more rapidly when fed with one substance than with another, to direct and guide us in the application of aliment to vegetables, as well as to the individual members of the animal kingdom. In the operations of art we must imitate the pro-

cesses of nature: rankness and coarseness of food produce an unwholesome vegetation, as is seen from excrements dropped on a grass field; and the effects of coarse and unprepared food are well known, on the forms of man and other animals, in producing large bloated carcasses. A mass of dung, cold or warm, lying in a drill, must be in too gross a form to present and afford ready and palatable aliment to the tender fibres of plants, and a further reduction and mixing is necessary to produce that mating of comminuted and finely-blended substances in which plants so very much delight to grow. The influence of air and moisture will reduce dry substances to a manure by blending with the soil. Much time, however, is required, and a great quantity of moisture, and the frequent stirring in the land. It is reasonable to suppose that farm-yard dung, and all substances that are applied to land as manure, should be in a reduced state; and in the case of the former it would require an application to the land at an early season that it may be broken and mixed by the subsequent workings of the land by the implements.

In dry land and early climates the land may be fully half prepared during the previous autumn, and the spring stirrings may be done in the month of May. The farm-yard dung may then be laid on the surface in broadcast, spread very evenly, and ploughed under with one furrow. Finlayson's harrow may then work twice, lengthwise and across, or more if necessary, which will mix the soil and the dung, and make the land fit for being sown, in the form of drills or on the flat surface in ridges. In order to facilitate the mixing of the soil and the dung as intimately as possible, the straw for litter must be cut by the thrashing machinery into lengths of four inches at most, which will not entangle the implements in the process of working the land. The dung will be carried to the field from the yards without undergoing any heating preparation to produce the gaseous elements.

This mode of applying farm-yard dung consists in mixing and blending the soil and the dung in the utmost possible manner of intimate comminution. It is in direct opposition to the present most approved mode of the putrefaction of the substances, the generation of heat, and the evolution of the gaseous fluids; but it rests on the undeniable specimens of nature's chemistry which everywhere abound. And though a chemical combination may ever exceed our powers, yet we do not know how near to it a mechanical mixture may approach; and if it be absurd to expect perfection in any attempt, there can be neither absurdity nor foolishness in making the nearest possible approaches to it.

In support of the theory now advanced, we bring forward the example of Delta grounds, alluvial lands, of lucustrine deposits, and of deposits of every kind, and of all low-lying grounds where a multitude of different matters have been congregated, and where they have been mingled into a state of very great fertility. The wonderful fertility of the Delta of Egypt is well known; yet, from the analysis of the mud of the Nile, here given, we cannot draw any conclusion in what elementary matters the principle of fertility is contained.

MUD OF THE NILE BY GIRARD:—

Water	11
Carbon	9
Oxide of iron	6
Silex	4
Carbonate of magnesia	4
Carbonate of lime	18
Alumen	48
	100

The peculiar state of the combination of the elements, and the external agencies to which they are exposed, no doubt are the cause of the unceasing fertility of the Egyptian soil. Climate, and the exhalations that are caused thereby, have a most powerful effect in counteracting the original constitution of soils: in many cases they defeat the natural quality, and in others they correct the constitutional defects. And though we certainly do not possess the suns or the exhalations of Egypt, that need not deter us from taking a lesson from the fact that is shown us, and trying how far the best mechanical mixture which we can bestow will resemble the formation of nature; and what effects it will produce in the geographical position of our locality.

A full century has elapsed since Jethro Tull published the idea of pulverization of the soil being made to supersede the use of dung; and though experience has overturned this position, yet the agricultural world has not at this day reaped above half the benefit of Tull's favourite conception. It is one of the general laws of chemical combination, that its efficacy is in the inverse ratio of the affinity of aggregation; for this latter power holds together the homogeneous particles, and prevents their separating and joining the parts of another body; and the greater the power is, the less efficacious must be affinity of composition. All chemical action is combination or union, and decomposition or separation; and light and heat often appear as the new arrangements take place—heat is disengaged, and often absorbed, and a change of temperature happens. Bodies that have little or no affinity, and do not enter into combinations, are made to do so by the addition of one or more substances; and this principle shows the necessity of applying a number of substances at one time, and of bringing them into contact with each in a state of minute adherence. Many kinds of chemical action are effected by heat, electricity, and other agencies, over which any control is impossible, and which do not take from mere mixture and comminution; yet by that process a ready accession of means will be afforded of producing combinations which in another state of existence of the substances would not have happened. All chemical forces are subordinate to the cause of life, and to heat and electricity, and to mechanical friction and motion. The latter power is able to change their direction, increase or diminish their tendency, and also completely to stop and reverse their action. But causes must exist to produce chemical affinity, or the cycle of life would stand still, and, from our ignorance of these causes and of the application, it is probable that in many cases their action is arrested and stopped, and often rendered useless or

not produced at all—or, at least, but accidentally—arising from proceedings not being yet based on definite or measured causes.

The effects of manures of every kind depend on the quality of the land to which they are applied, and also on the state of preparation of the soil at the time when the substances come into contact with each other. Finely-pulverized bodies cannot mix with those of a grosser form. Masses, lumps, and clods of homogeneous or heterogeneous substances will lie together and remain in the original state of cohesion or aggregation; but no affinity of composition takes place at "sensible" distances, and consequently no results follow from the combined influence of the bodies in union. The contact of a pulverized substance with a mass or any gross formation cannot produce the effects of combination. The finer particles of the former touch only the external surface of the latter, the interior parts remaining unaffected and unavailable for the purposes and effects of alteration. Hence the necessity of all substances that are brought into contact being reduced to the same state of minuteness, in order that combination may take place at "insensible" distances, and produce an active union from the reciprocal action of the molecules of the two bodies on each other. This affinity of composition is one chief agent in the operations of nature and of art; and the ease and rapidity with which bodies are decomposed, or enter into new combinations, are directly as the quantity of the surfaces that they present, or inversely as their masses. The efficacy of composition is inversely as the attraction of adhesion; the absolute force remains the same, but increases on account of the diminution of the opposing attraction. The investigations of science, the results of experience, and the conclusions of observation, unite in forming a powerful argument in favour of reducing to a state of the most minute subdivision possible all bodies that are intended to unite and incorporate with each other, in order to produce by their combined influence the substances, liquid, solid, or ceriform that enter into the organs and structure, and promote the growth of plants. The materials must be applied in the greatest possible number of particles. On this point science is decisive, and nature shows the example of alluvial grounds and deposits, and in fact of all improved cultivation. D.

Agricultural Institution, Hoddesdon, Herts, 24th Jan., 1848.

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

The usual monthly meeting of the club was held at the Club House, Bridge Street, Blackfriars, on Monday, February 7; subject for discussion—"Value of town and sewage manure, the best and cheapest mode of conveying it to the country, and the best form of application for crops." The attendance was good, and included several gentlemen of eminence in the scientific world. Mr. Shaw, of the Strand, presided.

The CHAIRMAN said: Before we proceed to business permit me to say, that, in filling the chair, to which you have done me the honour to appoint me, for the first time during the year, I can only regret that it has not fallen to the lot of one who is more capable, practically and otherwise, of performing the duties which devolve upon the chairman. I am more particularly induced to make this remark, because I follow a gentleman who not only devoted a vast deal of time and attention to the duties of his office, but performed those duties in a manner which insured the satisfaction of all, and who, at the same time, united with his other valuable qualifications that of being a *bonâ fide* farmer. This last circumstance I consider to be a vast advantage, not only to the man who is placed in the position which I now occupy, but also to yourselves as a club; and I feel the honour which you have done me to be the greater because I have not that claim to fill this position. However, I can only assure you that, as on all former occasions, I will endeavour to do my duty to the utmost of my ability in the position in which I am placed; and I ask you to extend to me that kindness which I know you are all disposed to extend to those who place their services at your disposal. I also trust that in any difficulties which may arise, you will, for the credit of the club, as well as to ensure regularity in our proceedings, support me as your chairman (Hear, hear). With these preliminary remarks, I beg to announce the subject of discussion for this evening. (The chairman then read the subject from the card.) This subject (he continued) will be introduced to you by a gentleman who, independently of the great amount of attention which he has given to the question, possesses the greatest desire to promote practical agriculture in every possible way (Hear, hear). It would be improper in me to anticipate anything which he may say on this question; I shall therefore only observe that I am deeply impressed with the importance of the subject, and I have no doubt that it will obtain your serious consideration. I believe that we are wholly in the dark as to the mine of wealth which may be worked in connexion with sewage manure—wealth which is unfortunately, day by day suffered to run to waste, whilst we are expending large sums in the purchase of foreign manure to enable us to produce food for the people. With these remarks, I beg to introduce to you the Rev. Mr. Warren, who is, I am quite sure, prepared to go into the subject in a manner suited to its importance.

The Rev. J. B. WARREN, of Horkesley Hall, Essex, on rising to introduce the subject, spoke as follows:—Mr. President and gentlemen, I shall avail myself of the practice of reading the few ideas which I

have put together on this subject, and by this means I shall enable you more completely to digest it. The subject I have to introduce for this evening's discussion is "On the Value of Town and Sewage Manure; the best and cheapest Mode of conveying it to the Country; and the best Form of Application for Crops." In the remarks I shall offer to your notice I must beg the indulgence of both practical and scientific farmers, desiring rather to leave it to the discussion of the subject to elicit the truth, than to presume to afford information to those who are so much better able to give than to receive instruction from me. I shall, however, take the privilege of offering my views, because I am deeply impressed with the belief that the subject involves in it the life, health, and enjoyment of mankind. You will bear in mind that the people naturally look to be fed through the instrumentality of farmers as manufacturers of food; and we ought also to bear in mind that we have no right to outstep our line of duty by undoing what we profess to do—that is to say, that, in the process of providing food, we have no right or occasion to poison the air or pollute the fountain of health. On the contrary, the course we ought to adopt, whether learned or unlearned in the science and practice of farming, I apprehend to be that which recommends itself by common sense, swayed by scientific research, and based on unerring truth. Surely the laws which regulate the production of food for man regulate also the production of nourishment for those plants which constitute the food; and if they be read and understood, will be found to be good and true, as emanating from the same Almighty Power. With these preliminary remarks, I will direct your attention to the subject in the order in which it stands, presuming that the value of what is called town and sewage manure is admitted to be such that it ought to be saved and applied to the soil. Those who will address you may perhaps touch more particularly on this part of the subject; for I am very glad to see a learned Professor present this evening, who has directed much attention to the subject, and is therefore well able to answer any questions which practical farmers may put, which may lead to the proper understanding of what constitutes value. Town and sewage manure is, as you know, composed of the excrements of animals and human beings, the sweepings of the streets, the refuse from manufactories, water-closets, sculleries, washhouses, &c., containing nearly all that is essential for the growth and nourishment of grass, vegetables, fruits, cereals, &c.—in short, returning to the soil the fragments of food which have been left, after man and beast have been fed and satisfied. These fragments or atoms of broken food are the materials best suited to build up again the elements of life. Now these elements so-called are not available for plants except in a liquid or gaseous form, because, from their structure, they can only absorb, and so appropriate and assimilate their food; air, light, moisture, and warmth being essential for the perfecting of the life and nourishment of this part of the creation. It is also desirable that food should be stored up and given to plants in a form convenient for use, wherefore the early and latter rain is looked for to effect that change in solid substances, whether organic or inorganic, which will render them available. Large heaps of organic manure lose a very great proportion of value from exposure to the atmosphere, or from want of a sufficient quantity of water to hold in solution the valuable component parts; for you well know that water carries or holds in solution the strongest and best part of tea or malt when either is manufactured. And if such be the fact, we have only to consider how we can convey the good materials in such a convenient and cheap manner as to effect the saving of all that is valuable. I need not tell you—for the press, and especially the *Times*, has already done so—that the Sanitary Commission has by incontrovertible evidence proved that the stagnation of sewer-water and filth composed of decaying and decayed animal and vegetable matter ought no longer to be allowed to remain in accumulation in towns and cities, destroying health and life. It may therefore be regarded as nearly, if not quite, certain that Government will very properly put a stop to such accumulations of poisonous matter, and to such a poisonous manner of removing it. We must therefore contrive, under these circumstances (and I think it will be shown that the plan proposed will be the best under any), to remove by other means than those now adopted the town and sewage manure. This brings me to that part of our subject, "The best and cheapest Mode of conveying it to the Country." There is a company at Manchester who have applied manure in the liquid form. I will read you a short extract published in the circular of the "Metropolitan Sewage Manure Company," which will give you some idea of the expense:—

"We first went to the Bridgewater Canal, to inspect the tank in which the liquid manure is collected and preserved for use; and having obtained much valuable information (presently to be detailed), embarked in a swift canal boat for Lymm, fifteen miles from Manchester, where the application of the manure was to take place, and where we found everything in readiness. The apparatus consisted of a barge containing a pumping engine of eight-horse power, and a tank to hold the liquid manure, brought from Manchester; of a second carrying barge, containing an additional supply of manure; and of main and branch hoses of considerable length. The staff, in addition to the men employed in navigating the barges and working the engines, consists of a superintendent and six men. The piece of land which happened at the time to require irrigation, is a narrow, irregularly shaped meadow, of about four statute acres in extent, of which the right side is nearly straight, while the left forms at the further end a considerable curve. Its length is between 300 and 400 yards, and to the end of the curved portion upwards of 400 yards. The canal at this point is raised about thirty feet, so that the hose, after being taken across the towing path, had to be carried down a steep bank, and across a narrow road into the field. The first part of the operation consisted in attaching the main hose to the engine, in conveying into the field the main and branch hoses, divided into lengths of twenty and forty yards, placing them in the required positions, and coupling them. The main hose, which was carried through the centre of the field to about one-fourth of its length, terminated in a branch of smaller dimensions, continued in the same direction; a second branch, attached close to it, was carried to the right; and a third, joined to the main hose, about forty yards from its extremity, was carried to the left into the bulging portion of the field. From the barge to the extremity of this last-

named branch was about 400 yards, or nearly a quarter of a mile. The three-branch hoses terminated in tin tubes, about two feet long and two inches in diameter, with spouts shaped like a fan, or the flattened rose of a watering-pot, about four inches wide and the third of an inch deep. The hose and its branches having been arranged, the engine was set in motion, and in the course of a few minutes the liquid flowed from the tubes. The application of the liquid was easily and expeditiously effected, one man guiding each tube, and another dragging the hose over the field. The men who guided the tubes scattered the liquid in a half circle from side to side, as if they had been sowing wheat, moving slowly backwards from spot to spot till the whole field had been irrigated. In order to enable the men to distribute the liquid with regularity, and not to leave any portion of the surface unirrigated, the field is marked out by small stakes, which guide the men in their work. This precaution is absolutely necessary when the grass is wet with rain. In dry weather it is not required; nor would it be required on arable land in regular stetches. The whole operation, though more than once interrupted by the traffic on the towing-path, and by other causes which it is not necessary to specify, occupied from a quarter past eleven, A.M., to a quarter past two, P.M., or exactly three hours, being three quarters of an hour for each acre. The safety-valve of the forcing-pump is loaded with 40lbs. on the square inch, being equal to a pressure of about eighty-nine feet, which pressure cannot, therefore, be exceeded with this apparatus, and is rarely attained. The liquid issued from the pipes in a full and uninterrupted jet of from one to two yards in length. On this occasion, as the grass was already saturated with moisture, the liquid was applied in the proportion of one part of the manure and three parts of water, the quantity of the manure being three tons to the acre. In dry weather the same quantity of manure is diluted by more than six times its bulk of water. The arrangement for mixing the manure with the water, and for measuring the quantity delivered, are so exclusively adapted to this particular mode of application, that your reporters do not deem it necessary to describe them. The manure employed by the Liquid Manure Irrigation Company is the more liquid part of night soil unmixed with other refuse matter, and as concentrated as it can be procured. It is brought to the store tanks on the banks of the canal, in large water casks, mounted on wheels, at an average cost of 3s. per ton. The price varies with the quality, which is determined by its specific gravity. The higher the specific gravity of the liquid, the higher the price given for it. The quantity of this liquid applied to an acre of ground is three tons, diluted, according to the state of the soil, with from three to six times its bulk of water. When diluted with three times its bulk of water, as on the day on which we witnessed the application, the odour is very perceptible, but neither very offensive nor very enduring, and certainly much less offensive than that of many manures in common use. We are informed that it disappears in about three hours, and that cattle will eat the grass on the following day, or even on the same day. When diluted with six times its bulk of water, the smell is but very slightly perceptible half an hour after its application, and in no case is any annoyance occasioned to the neighbourhood. The time required to irrigate an acre of ground, in the manner already described, is three quarters of an hour; but when the many causes of delay incident to this mode of application in its present state are taken into account, your reporters feel warranted in stating that an acre of ground could be very effectually irrigated from the pipes proposed to be laid down by the 'Metropolitan Sewage Manure Company' in half an hour at the outside, and that by a well organised and practised staff of six men and a superintendent, twenty acres, provided the fields to be manured lay contiguous to each other, might easily be irrigated in one day. The cost of the application, on the supposition that the men receive 2s. 6d., and the superintendent 5s. a-day, and that the same number of acres were irrigated every day in the year, would amount to *one shilling* an acre; the cost would, of course, be increased, if the men, being permanently engaged, were only occasionally employed, or manured a smaller number than twenty acres. The charge for a single application of twenty tons to the acre is £1, and 6d. additional is charged for each mile the apparatus and manure have to be carried from Manchester. The charge at first was 10s. an acre for ten tons per acre; but the same parties who originally paid that sum now willingly pay the higher price. Nor does the increased charge prevent the application, almost daily, of new customers. The application that we witnessed on the 17th was the second on that day, and we were informed that as many as fifteen acres have been manured on one day, but the quantity rarely exceeds ten. It is expected, however, that with improved apparatus, and especially with a more easily moved barge, the average daily performance will be 15 acres. The demand for the liquid manure is on the increase. Already three hundred acres have been manured for the Earl of Ellesmere and his tenants, and several hundred acres for other parties. Mr. Holland, under whose general direction and the patronage of Lord Ellesmere the affairs of the company have been conducted, expresses a very strong conviction, that if a conduit for the sewage of Manchester were constructed along the bank of the canal, as he suggested in his report, published by the Health-of-Towns Commission, for carrying out Mr. Chadwick's views in that district, such a conduit would form the best and cheapest source whence liquid manure could be obtained for distribution by such apparatus as he is now using. Indeed, the construction of such a sewage conduit, and the use of moveable engines and pumps for the distribution of the liquid manure it conveys, was the original idea from which the present undertaking originated; and the present operations may probably prove introductory to the original scheme, which is, in many respects, analogous to the intended operations of the Metropolitan Sewage Manure Company. It appears that the company are in the habit of applying three tons of manure diluted with water to each acre of ground, at a charge of £1 per acre, and 6d. a mile additional from the source of supply; and the evidence obtained of the excellent effect of the application and of the large and increasing demand existing for the manure, proves that the company is fully warranted in making that charge. Now, Dr. Miller's analysis shows that thirty tons of sewage will be a fair equivalent to the three tons of liquid applied by the Manchester company. It is therefore safe to infer that the 'Metropolitan Sewage Manure Company' would be justified in charging £1 per acre, and 6d. a mile for the distance from their station, for an application by hose of thirty tons of sewage. This would be at the rate of 8d. a ton, including the cost of application, and the wear and tear of hose. The price per ton would probably be diminished, if the quantity applied were increased; and it might also admit of material reduction if supplied by methods not entailing the labour required in the application by hose. In supplying thirty tons of sewage to the acre, your reporters would suggest that the Metropolitan Sewage Manure Company will be giving more than an equivalent for the three tons of the Manchester Company, for the sewage submitted to analysis was that of a sewer (the King's Scholars Pond Sewer) which receives a large quantity of upland drainage, while the smaller sewers which will discharge themselves into the com-

pany's sewer are supplied almost exclusively from the houses, and therefore discharge a richer sewage. Moreover, the specimen of sewage from the King's Scholars Pond Sewer, which Dr. Miller has made his standard of comparison, though corresponding closely with an average specimen examined by Mr. Brande, had less than half the strength of another average specimen examined by Dr. Miller, which was found to contain upwards of seven grains of ammonia to the gallon. It must also be borne in mind, that before the company comes into operation, great extension will have been given to the house drainage, both by the growing sense of its importance, and the stringent operations of the act recently obtained by the Westminster commissioners of sewers. As the company will have the command of several sewers, and its servants will doubtless be strictly enjoined to admit into their sewer only the more concentrated liquid, your reporters have every reason to believe that the suggested application of thirty tons to the acre will be more than an equivalent to the quantity of liquid manure used by the Manchester Company, and that the Metropolitan Sewage Manure Company may fairly charge £1 per acre for each application, and 6d. a mile additional for every mile that the land to be manured is distant from the company's station."

Such is the proposed plan and cost of conveying town and sewage manure to the country. At present a barge freight of from 14 to 20 loads, varying with size and quality, costs from £6 10s. to £9 at the water-side. One load of 35 cwt. would cost 18s. to be conveyed 4 miles, so that 10 loads an acre would cost £9. A practical farmer informs me he would apply 30 such loads for his swedes or wurtzel. Another practical farmer states a barge-load of from 60 to 70 tons would cost at Colchester Hythe, £15 or £16, that he prefers mixing it with good farm-yard manure; but in a *dry* season it will do no good; that it should be carted direct from the barge, because it loses a great deal of its goodness, and wastes very much, if left long. A gentleman who has published his experience on the value of liquid manure in the last "Journal of the Royal Agricultural Society," states the wonderful effects of horse-urine, diluted with water. He says he "believes the great fertilizing power is in the urine, the fæces containing principally lime and sand. The sewage must contain," he says, "in dry weather, a very large proportion of urine of the best kind—that of man, eating flesh, and drinking wine, beer, and every kind of strong drink." The Professor Henslow, the Rev. Mr. Huxtable, and others, speak of the undoubted value of sewage manure. Mr. Heyworth, a Liverpool merchant, addresses the Secretary of the Health of Towns Association as follows:—

"From practical observation, I believe that if the noxious matters which, now being left to waste, generate disease and spread desolation over our population, were scientifically collected and transferred to the soil, they would not only remunerate all cost by the abundant fertility they would induce, but would be a mine of wealth to the promoters of any scheme for this purpose, and thus the promoting of self-interest would thenceforward be the security of public health. By means of earthen pipes, small covered cesspools, and stench-trays, I convey all the waste water, including that from the waterclosets, chambers, scullery, washhouse, &c., and all other feculent matter in a diluted state, from my residence, stables, sheep-pens, &c., into one end of a large excavated dungpit, which, being always covered with litter, never allows any escape of noxious effluvia; at the other end of the pit I have a covered well outside, communicating by small openings with the bottom of this pit, from which the fluid manure is lifted by a pump into a covered water-tight cart, and carried upon the fields. The quantity of this liquid manure from my single establishment covers annually about 20 acres, and renders them profusely luxuriant. For the rain-water and springs I have separate and distinct drains, which is an essential arrangement. What should prevent a scheme so encouragingly profitable from being applied in collecting and distributing the liquid manures of towns generally, if incorporated companies were authorised by acts of Parliament to enter upon such undertakings?"

I have only one other point to touch upon. I shall not occupy your valuable time but for a little while, as there are persons in the room so much more able than I am to explain the organization of plants, the nature and mode of absorption of nourishment, that I feel I have only to direct the attention of men of science to this part of my subject, to obtain for you that elucidation of facts which will prove the necessity of studying the laws of nature, in order to increase the fertility of the soil, and provide food for an abundant population. It would betray much ignorance to give to animals and human beings in the earliest stage of life strong meat and drink, which require of them the exercise of ability they do not possess, which require teeth and power of digestion to assimilate. So with regard to plants, if we give them nourishment in the solid form when they can receive it only in the liquid or gaseous, we oppose the laws of nature, and must wait until the rain descends to divide and dilute the solid concentrated food. I have now endeavoured to bring this important subject of discussion before you, and I hope you will not censure me for the want of practical and scientific knowledge I may have betrayed in introducing it to your notice, but that you will so give it your attention as to assist in developing the resources we have at home in providing abundant food for an increase of population, and leaving a store in hand for our neighbours on the continent.

Mr. Cuthbert W. Johnson: Sir, we must all feel exceedingly obliged to Mr. Warren for the very able address which he has favoured us with this evening, on a question of national importance; a question of which I am sure that the more it is examined the more will it engage the attention of the agriculturists of this country. With your permission I will proceed to speak of what appears to me to be the most useful course that this club can take in reference to the question introduced by Mr. Warren. The first point for examination will not be, I think, that upon which Mr. Warren has laid stress, viz., the advantage of the application of sewage manure in the concentrated state, to which the labours of the society at Manchester more particularly relate; because I take it that the farmers in the neighbourhood of large towns are already in the habit of availing themselves of such manure. The matters collected from cesspools and water-closets, unmixed with water, are already generally conveyed in the neighbourhood of London from the town to the adjoining districts, in waggons constructed for the purpose, and are applied to the land

without much difficulty; nor do farmers stand in much need of instruction as to the mode of applying such substances. But with regard to the contents of the sewers of London as they really exist—that is, mixed with a large quantity of water from the overflow of the water companies' pipes, and from water closets—that I believe is a question of great national importance, to which sufficient attention has not yet been directed, and it is to that subject that I shall direct my observations on the present occasion. Now, the first point, which is not, I think, generally understood by the farmers of England, is this, "Of what do the London sewers consist, mixed as they are with water pouring down in very large quantities, and emptying themselves in the river Thames?" I find that a gallon of London sewage water—I took this calculation from the sewer alluded to by Mr. Warren, viz., that of King's Scholars Pond—upon being analyzed, was found to contain 85 grains of soluble matter. Now, in researches of this kind, it must be useful, when a certain manure is offered for examination, to compare it with some other manure of known and admitted value, about which there can be no difficulty or misunderstanding on the part of any farmer in the kingdom. I have, therefore, thought it desirable to compare the substances contained in the King's Scholars Pond with those which are found in a gallon of the urine of a pasture-fed cow. While a gallon of the former contained 85 grains of soluble matter, the latter was found to contain 527 grains; therefore, a gallon of the urine of a cow contains nearly as much as 7 gallons of the King's Scholars Pond; 6 gallons of London sewer-water contain, at least, as much saline fertilizing matter as one gallon of a cow's urine. It must be useful to observe the composition of the contents of the two. The sewage water contains salts of ammonia, phosphate of lime, and the finely-divided organic substances which constitute the food of plants. Now, it appears, from several analyses, that the sewers of large and small towns are very similar in their contents. We should hardly have been prepared to find that the sewage manure of a town as large as Edinburgh or London contained only the same proportion of valuable manure as a town like Mansfield, in Nottinghamshire, having perhaps only about 10,000 inhabitants; yet such is the fact. An imperial gallon of sewage water, at Mansfield, contains 4 grains of ammonia. A gallon of the sewage-water of Edinburgh contains 4 grains and about 4-10ths of a grain of ammonia, while a gallon of the King's Scholars Pond-water contained about 3 grains of ammonia. Now this is a curious fact. I think if it were generally understood that the sewage matters of small towns pretty nearly assimilate in their composition to those of large cities, this fact would induce farmers generally to direct their attention to the value of sewage manures in their own neighbourhood for the purpose of irrigation—a question to which I am about more particularly to allude. I will not travel through the analyses which I have here, showing the close similarity which there is between the composition of the urine of cattle, and the matters connected with the sewage of towns. Although sewage matters exist in the metropolis in such large masses for the purpose of irrigation, and although they contain the substances to which I have alluded, ammonia and phosphate of lime, which abound in the urine of cattle, yet as they are so much weaker than in the urine in question, as it requires six gallons of the water of a sewer to yield the same quantity of fertilizing matter as one gallon of the urine of a cow, it follows from this that, for actual use, the sewage matters of towns are required in very large quantities, and I should despair of the success of any plan in the preparation of which this circumstance were not taken into account. Let it be understood that I am speaking not of any strong concentrated matters collected from water closets and privies, such as those referred to by Mr. Warren in connexion with Manchester, but of the various kinds of water partaking of the character of manure which pour into the river from the sewers of towns. I am speaking of that kind of manure as it really and truly exists. I submit that, if this is to be applied to any useful purpose, it must be devoted to irrigation. With this view it cannot, as in the case alluded to by Mr. Warren, be carried away in barges; it is required in large quantities, similar to the manure employed on the meadows in the neighbourhood of Edinburgh, where there is land absolutely irrigated by the sewerage of that city. For this purpose I am not aware of any plan by which it can at present be rendered available to farmers in general, and it is to this portion of the case more especially that I wish to direct your attention. It is, I perceive, suggested in a very valuable report lately issued to the public by her Majesty's Commissioners appointed to inquire into the sanitary condition of populous places, that, in certain low lying districts, as, for example, in the case of Southwark, where the level of the land is below high-water mark, in order to get rid of the difficulty of obtaining a sufficient fall, it is suggested that all the sewage matters should be pumped into the Thames, Southwark being thus drained, in accordance with the plan successfully applied in the draining of the low-lying districts of Lincolnshire. Now it occurs to me, that if this plan of employing large steam-engines to pump away the sewage matters created by so large a mass of inhabitants as those of London and the adjacent districts were extended a little further, great benefit might arise from such an extension. Instead of conveying the matter directly into the Thames, the commissioners might perhaps be induced to pump it to a rather higher level, and by extending the pipes a little lower down the river, they would enable farmers to avail themselves of it for the purpose of irrigation. It would be useless to expect any individual farmer to make the drains necessary to convey such matter to a sufficient distance from the place where it is produced to render it available for his meadows; but if her Majesty's ministers or the Commissioners of Sewers would provide for the pumping of the sewage matters connected with two or three hundred thousand persons living together, such a collection of matters pumped down the valley of the Thames on the right bank (say, below Woolwich, or as far as Erith) might be rendered available for the purpose of irrigation to such an extent as to lead to important national results. I beg to remind you, too, that I am not addressing myself to a mere theory, or introducing a question of untried or doubtful value;

what I desire is, that her Majesty's ministers may be the medium of carrying into operation in the neighbourhood of London a plan which, in the neighbourhood of Edinburgh, with regard to three or four hundred acres of land, has been found productive of the most extraordinary results—results so extraordinary, as regards the increase of the value of very poor land, used for the purpose of producing grass, that it will be best, perhaps, not to allude to so enormous an augmentation. The increase in the rental is so great, that if I were to state it to those who were not previously acquainted with the fact, they might readily suppose that I was indulging in an exaggerated statement. Gentlemen, I feel that this is the first point of importance to which the attention of the meeting may be usefully directed; and it is, therefore my intention to propose, either as a rider to any other resolution which may be proposed, or as a substantive motion, the following resolution :—

"That the members of this club are deeply impressed with the value of the contents of the public sewers for the purposes of irrigation, and that they are extremely desirous of impressing upon the government and her Majesty's Commissioners for Sanitary Inquiry, and the Commissioners of Sewers, the importance, in any plans they may adopt for pumping away the sewage of the metropolitan districts, of conveying it to such a distance from the metropolis, and at such an elevation above the level of the Thames as will facilitate its use, especially for the irrigation of grass lands."

I feel, gentlemen, that I have already trespassed too much upon your time; but I address myself to you on this subject after mature consideration, and with a strong feeling that if her Majesty's Commissioners and the Commissioners of Public Sewers could, in dealing with the sewage matters of the great metropolis, be induced to have them conveyed to such an elevation above the level of the Thames as would enable farmers to avail themselves of them for the purpose of irrigation, they would give the farmers an opportunity of employing them in the most beneficial manner, and of extracting from them their true value. There may be doubts as to the practicability and profit of carrying this manure in barges or waggons; there may be doubts about a variety of particulars to which it is unnecessary for me to allude; but as to the value of sewage of large towns for the purpose of irrigating grass lands, there can be no doubt whatever; and I believe that if the plan which I have suggested were carried out, we should confer great advantage on those whom we are most anxious to benefit.

Mr. Nesbit.—Mr. Chairman and gentlemen, I have a few observations to offer on this subject. It has occurred to me that perhaps a comparison between the nature of the substances made use of in the neighbourhood of Manchester, and the nature of those to be had in London, cannot be unimportant. I happen to be acquainted with Manchester, and with the habits of the people, for a number of years; and I am, therefore, in a position to state that the manure obtained thence is far stronger than any which can possibly be got in London. It is there a constant habit, in consequence of the existence of large dyeing factories, to save the urine; keeping it by itself, without any mixture of water, and it is constantly sold in the town to the dyers at so much per bucket, 2d. being about the ordinary value: wherever such factories exist, urine is made use of in the process of dyeing. Persons usually give 6s., 7s., or even 15s., according to the size, for liberty to empty a privy. The farmers come there with carts containing straw; they spread the straw on the ground, and get the liquid in buckets; the ashes are thrown on, and the whole is taken away in carts. Now, if you consider the case of the people of London, in connection with the application of sewage, you will find a great deal of difficulty in connection with the object. It is here the habit to have water-closets which are washed out with a large quantity of water; and this water carries down with it the solid and liquid matter, together with the other substances which are occasionally thrown in. Of course you are all aware that the liquid excrements of an animal contain the soluble parts of food—the urea, phosphate, and other substances of that kind, and that the solid excrements contain the insoluble parts. It is quite certain that these liquid excrements are of great benefit to the land; but, being diluted with such an amount of water, the question arises whether it would pay to pump them up to the level of the lands in the vicinity of London. As regards the proposition of draining London by means of the Commissioners of Sewers, there is one important question to be considered; viz., What is to become of the solid matter? Supposing they pump the liquid matter only, what are they to do with the solid excrements? If the liquid be not in constant motion there is certain to be some deposit. This must be taken away in some shape or other, either, perhaps, by being washed into the Thames, or by being carted away. We must bear in mind that these solid excrements contain insoluble phosphate of lime, and other substances of that kind, which are valuable, as well as the liquid matter, and I have not heard what is to be done with them. In addition to the water proceeding from the water-closets, there is the rain of heaven falling into the streets; and unless some means be taken to get rid of all this water, we shall have continual dilutions, which I conceive to be an important objection. Now, these are questions which have reference to the practical carrying out of the ideas of the Sewage Company. It is quite certain that if the Sewage Company could devise some means of separating the waters from the soluble matters, the accomplishment of the matter would be most beneficial; but there are no means, as you are all aware, of precipitating the ammonia, potash, or the soda, from the water; and these happen to be the most valuable substances with which the farmer has to deal. It would facilitate the object very greatly if means could be adopted for draining houses alone, having separate drains for the water of the streets. As the Commissioners of Sewers are about to lay down new drains, might they not contrive to have the liquid and solid excrements washed down in separate places, leaving the water of the streets to run down by itself. It strikes me that there would then be a greater probability of doing

justice to the farmer, or any one else, who might have to pay for the application of this manure. Very little argument is required as to the importance of the object itself. No one doubts the practical importance of getting the thing done, if it can be done in a proper way, with a view to pounds, shillings, and pence. (Hear, hear.) But I should like to see an exact comparison between the amount of ammonia and phosphoric acid, potash, and soda, contained in these waters, and their estimated value as compared with substances at present available for the same purpose; that is to say, supposing the sewage waters can be supplied at so much per ton, and supposing they contained so much phosphoric acid, so much soda, so much potash, and so much ammonia, I should like to see for what sum the same amount of benefit could be obtained, either in the form of Peruvian guano, or in any other form available. That, I think, would be a tangible way of coming before the public, and ascertaining whether sewage manure is available on a large scale. If, by pumping up a given manure, we could secure to the farmer the soluble matters which I have mentioned, at a cheaper rate than he could buy them in the market, it would be a most proper thing to do. Every one, who takes an interest in the agriculture of this kingdom, must desire that something should be done, whether by this company or by that, or by the government itself, to render available the soluble matter of the metropolis. As Mr. Chadwick is present, I have no doubt we shall hear from him some remarks, not only in relation to the importance of the subject, but also to the practicability of carrying out our object.

Mr. THOMAS said that what he had heard that evening recalled to his mind a scene which he had witnessed near Paris in 1830, when, as he had just commenced farming, he was anxious to know how far the sewage of towns could be applied to its purposes. The plan then adopted at Paris was to empty all the cesspools into the streets, and the matter was all carried away to a place called Montfaucon, in the vicinity of the capital; the operations being performed in the night. There was, first, an elevation where the manure was collected; further on, at a lower elevation, there was a second kind of tank, to which the manure ran; and still further on, and lower down, was a third reservoir. The manure remained for some time, until a very considerable portion of it had been absorbed by the atmosphere. The result of having these successive tanks was that the manure in the uppermost one became dry in the course of two or three months, and was then carried away by the farmers in the neighbourhood; that in the second was also carried away after a time; and the residuum was employed in the irrigation of the lands in the immediate neighbourhood. He had thought it well to mention a plan which was carried out on such a large scale; and he would only remark, in addition, that he believed the farmers of the communes found the manure much cheaper thus obtained than they would have done by attempting to carry the whole bulk at first.

The CHAIRMAN said—Gentlemen, you all know that we have a rule that no person but a member of the club can speak upon the question under discussion, except by special permission. There is a gentleman here who possesses a great deal of knowledge on this subject, although he is not a member (Mr. Guy), and to whom I have no doubt you will willingly concede the privilege of addressing the meeting.

Professor GUY said—I ought, perhaps, to apologise for addressing you before Mr. Chadwick, but as that gentleman has not heard some remarks which have been made this evening—[Mr. Chadwick entered the room after the discussion had commenced]—he may not be in a position to throw light on the questions introduced. Mr. Nesbit has spoken of the necessity of separating the different kinds of waters which flow into the sewers. He says, if I did not misunderstand him, that the water which flows into the sewers is not one homogeneous liquid, but a liquid and a solid. Now, it is essential that every one who deals with this subject should understand in what precise state the sewage water flows through the sewers of London. If you watch it as it passes from the sewers into the Thames, you will find that it is a perfectly homogeneous liquid. It contains solid matters in a state of perfect suspension, and fluid matters in a state of perfect solution. There is, therefore, no necessity of separating one part from another; it is so diluted that as it exists with all the different matters mixed up together, it can be just as easily pumped away as so much dirty water in which the hands have been washed. I thought it right to make this remark, for it is not to be supposed that the gentlemen whom I see around me have investigated the condition of sewer water in the same way as those who are directly interested in the matter. There is another point on which I think there is some misconception; and this is not the first occasion on which I have observed such misconception—it has relation to the comparison between the Manchester liquid and the sewer water of London and other large towns. The liquid applied at Manchester is a diluted liquid; the matter taken out of the cesspools is already in a very diluted state; in a liquid form it is taken down in barges, and before being applied to the land it is further diluted; perhaps, if applied in moist weather, it is diluted three times; if in dry, six times. From a careful comparison of this liquid in its original state with the liquid of King's Scholars Pond, it appears that the proportion is 20 to 30. Such is the proportion between the sewage water and the liquid used at Manchester for agricultural purposes. I hope I have made myself clear on this point. My great object is to show that the liquid which flows through the sewers of London, although diluted, is not diluted to a greater extent than might be desired by practical men. Now, I think I can throw some light on the value of the manure of towns generally, by stating what has lately been done by some friends of my own in the country. I have been on a visit to Cambridgeshire, where some friends of mine occupy a large mansion, situated on an estate of 1,200 acres. The permanent number of inhabitants, suppose the family to live there always, is about twenty grown up persons. There are stables and other outhouses in connection with the house, and immediately round the house are five and twenty acres of

ground. Up to a very recent period all the valuable drainage of this large establishment escaped to a ditch, thence to a river, and thence into the sea, being lost to agriculture. I could not help protesting against this waste, which, if it arose from ignorance, would be a misfortune; if intentional, would be almost a crime. After a good deal of discussion, I at length persuaded my friends to construct a tank. This was done within perhaps about fifty yards of the house. They were in a great degree induced to construct it through seeing a report in the last Quarterly Journal of the Royal Agricultural Society, in which Mr. Dickenson states that a tank for the reception of liquid manure may, in a clay soil—and this was a very tenacious clay soil—be made for £2 17s. 6d. Seeing that it might be done so cheaply, the tank was made; and I believe I am right in asserting that the actual cost was about £4. Here they contrived to impound all the liquid which had previously been running to waste. Let me now inform you what I believe to be the money value of the liquid thus impounded, for this is a very important point. There are, as I said before, twenty grown up persons living in the house. These persons cannot consume less, living as they do at full keep and a large and liberal establishment, with a great many visiters, than £400 worth of food in the year, £20 for each. Now the ashes of food which costs £400 must have considerable value. By the ashes I mean the excreta, solid and liquid, which passes from the human frame. The fæces and urine, or, to use a delicate term, the ashes, must have a very high money value. Dr. Lyon Playfair says that that which passes away from the adult human frame is worth £1 17s. a-year, and that this is the value actually put upon it in Flanders. I have no means of proving, but I will give you whatever information I possess on the subject. Professor Miller, of King's College, has calculated, at my request, the value of three principal elements contained in the human frame—the ammonia, the potash, and the soluble bone or earth. On the supposition that these things are extracted in the pure state and then offered to the agriculturist in the market, the value would be 12s. 6d. for each person. The three elements of the excreta, in the case of these grown-up persons, I put down at 12s. 6d.; and if we add 2s. 6d. for other elements not included in this estimate, we get 15s., which I am quite sure you will agree with me is not exaggerated, to put down as the real value of what passes from the human frame in the course of the year. Here, then, we start with 15s. a-year as the minimum value of the excreta of the persons constituting this household. Then I have ascertained that the soap consumed amounts to 15s. a-year for each person. I do not know exactly what agriculturists would give for soap reduced to a watery state, but I think that taking such water, and adding to it the common salt and the refuse of the kitchen, consisting of vegetable and animal matter unused, it cannot be too much to put down for the whole an additional £5, making, with the value of the excreta, £20 a-year. Then there are the stables. The average number of horses kept throughout the year is five, and if we put down, what cannot I think be exaggeration, £1 per head for each horse, the refuse matter from these various sources is not worth less than £25 a-year. Of course it will be open to discussion whether or not I have overestimated anything; but the question is at all events an important one. The tank cost £4. A pump has been erected at a cost of about £4 more, in order to pump all this matter from the tank. Supposing the whole were to cost £10, there would still be secured in the first year £15 worth of valuable matter, and in all future years £25. Now, with regard to the mode of application: they have pumped into the water cart about ten tons of liquid manure, which in a few hours has been applied to the land. It was their misfortune to be obliged to use two horses along the ridges of the land; and I am informed that the wheels of the cart have somewhat injured, or, to use the proper term, poached the land; it will be impossible to use the cart again in wet weather. This is the great objection; and the question arises, whether a better and cheaper mode of application might not have been discovered. I have no doubt that the true mode is to erect over this tank a forcing pump, instead of the ordinary lifting pump. The manure has been applied to about eight acres, hitherto a miserable piece of grass land, yielding one crop in two years; by-and-by I have no doubt it will be seen in a better condition. Now I will not trench on what is properly Mr. Chadwick's own branch of this subject. I leave him to tell you all that he has been able to glean as to the best and cheapest mode of applying sewage manure to land. I would direct your attention to the examination made by Mr. Sherman and myself, as to the application by hose, which is an extremely cheap application, as compared with the water cart. I have given you an isolated instance of a house in the country in order to bring your minds to bear on the question of the value of such substances. I have shown you that what passes away from many adult human frames in the year is worth not less than 15s. Even taking one town with another, one inhabitant with another, taking grown up persons of both sexes in this metropolis, I think you will admit that we have a manure which cannot possibly be worth less than 10s. per head of the whole population; and my belief is, that when you get all the liquid manure of towns conveyed to suitable places, it will be greedily taken by farmers. I cannot suppose that such a supply of manure, when offered to the farmer at a moderate rate, will be neglected by him. I have here a calculation put into my hand by Mr. Miller, to show how readily 1000 tons can be conveyed ten miles, through a twenty-five inch pipe, for 17s. 11d.—1s. 9½d. per 100 tons, or rather less than one farthing per ton. We have, too, the experience of persons in the neighbourhood of Manchester to guide us on this subject. It is not likely that they are so blind to their own interest as to get what does not yield a profit; and yet they use machinery which, compared with that proposed to be used in the neighbourhood of London, is both clumsy and dear. Instead of having barges to carry away the manure, here is to be one machine always on the spot; the manure, too, will not be a nuisance when it is not in demand, ready to be used when wanted, and ready, too, in seasons of drought, which are not

rare in the neighbourhood of London, where the fall of water is exceedingly small to be employed for the purpose of irrigation. The question is altogether one of national importance. Under present circumstances, the price of food is necessarily high. By eating food, and not restoring the ashes of it to the ground, we are exhausting the ground by everything that we eat; whereas, the true principle is, after having used the food for the support of our own frames, to let it go back to the earth to reproduce other food. See how this principle tends to overturn altogether hypochondriacal fears as to our not being able to feed our large and increasing population. Why, everybody knows that in a country like this, a large population is a thing to be desired. But if we throw away the manure of towns in which the great proportion of the people are congregated, we cannot feed them with the assistance of all the guano in the world. As we are now open, and I believe happily open, to the competition of the whole world, it is an essential accompaniment of that competition, that the manure of our towns should be placed at the disposal of the farmer, and conveyed to him at the cheapest possible rate, and by that mode of conveyance which can alone be cheap and effectual (cheers).

Mr. CHADWICK stated that the sanitary enquiry had brought him into the domain of agriculture, by the contrast which the urban and the suburban districts presented. The condition of large rural districts in the immediate vicinity of the towns, and of the poorest districts of the towns themselves, presented a singular contrast in the nature of the agencies by which the health of the inhabitants is impaired. Within the towns we find the houses and streets filthy; the air fœtid; disease, typhus and other epidemics, rife amongst the population, bringing, in the train, destitution and the need of pecuniary as well as medical relief; all mainly arising from the presence of the richest materials of production, the complete absence of which would, in a great measure, restore health, avert the recurrence of disease, and, if properly applied, would promote abundance, cheapen food, and increase the demand for beneficial labour. *Outside* the afflicted districts, and at a short distance from them, as in the adjacent rural districts, we find the aspect of the country poor and thinly clad with vegetation, except rushes and plants favoured by a superabundance of moisture; the crops meagre; the labouring agricultural population few, and afflicted with rheumatism and other maladies, arising from damp and an excess of water, which if removed would relieve them from a cause of disease, the land from an impediment to production, and, if conveyed for the use of the town population, would give that population the element of which they stand in peculiar need, as a means to relieve them from that which is their own cause of depression, and return it for use on the land as a means of the highest fertility. The condition of the rural population on the Plumstead marshes, and of the land there, and much of the suburban marsh land in Essex, might be presented as sample of these contrasts. When the means of relief were considered, they were found to be mainly in the facilities for agricultural improvement; in thorough drainage, in rendering the land fit for the reception of these town manures; which land, whilst surcharged with moisture, was unsuited for the reception of any manures whatsoever. Much had been said of the money value of town manures; but, from its abundance, there really was at present little or no value attached to it whatsoever. A scavenger would try to make what he could get upon any application for purchase; but the absence of money value was shown by the quantities thrown away, and the efforts made to get rid of it surreptitiously. In the present state of things in the metropolis, the practical questions for consideration were as to its productiveness, and the expense of removing and applying it. In respect to the productiveness of sewer water there was much loose statement; for what were the chief ingredients contained in it? night-soil and urine. We should deem it an impertinence to address an assembly of agriculturists on the productiveness of those manures (Hear). Sewer water had been spoken of as if it were one and the same fluid everywhere, the fact being that in some districts only one house in twenty, in the metropolis, drained into a sewer; in the City of London, one only in three; and in parts of the metropolis every house drained into it. There was a fertile source of disputation as to the effects of sewer water, without taking into account that it must differ from mere surface water, with a slight infusion of manures, to water with the manure in a comparatively high state of concentration. It must be evident to them that, as town drainage was improved, as every house was drained, so must the condition of the sewage water and the amount of fertilizing matter which it held in suspension be varied. The practical questions were, as to the means of removal, and the means of applying it to the land. The results of his investigations were, that there were no means of removal so inoffensive, so quick, attended with so little loss of manure, or so cheap as removal in suspension in water; and no mode of applying manure to the land so productive, so uniformly productive with machinery, so ready, or so cheap, as in the liquid form. In illustration of the cheapness of removal in the liquid form, he mentioned that at the present charge of pumping with the steam engine, 80,000 gallons of water could be raised one hundred feet high for a shilling; and they might judge of what might be done for removing manure out of town by the expense at which some water-companies brought water into town. Some companies took up water eight or ten miles off, filtered it, conveyed it the eight miles, lifted it up to the upper story of the highest house, and, if there were a demand, would lift it to the top of the highest steeple, at a rate of two-pence per load; and paid themselves six or seven per cent. for their investment. What cartage could compete with such a principle of removal? When investigating the means of cleansing and watering the street, he found that when stand pipes were properly laid, and supplies of water properly laid on at high pressure, one man might water an area of street equal to twenty acres in about ten hours. Mr. Smith, of Deanston, when consulted upon the means of disposing of the manures of towns, proposed the extension of the system

of distribution in use at Edinburgh by the water meadows. In some districts that system might be applicable, but there were various objections to it, into which he entered. He (Mr. Chadwick) had proposed experimentally the practical application to the farm of the results of his observation of the principle of watering the streets. In the first experiment which he got tried, with a separate machine for a farm, it was found that twelve or fourteen loads of liquid manure could be laid on an acre at an expense of 1s., by means of a flexible hose. With the water-cart the expense would be the labour of a man and horse for at least a day, and the poaching of the land, at an expense of not less usually than 10s. per acre. Where a common pump was used, worked by two men, with one man to direct the nozzle of a hose, four hundred yards long, the expense had been found to be one shilling and eightpence per acre for a dressing. The water-cart could not at many seasons be got on the land; the hose could be got on at any and every time. The Manchester example was a further and varied illustration of the application of the same principle. The great advantage of the application of the principle of the hose was, that it would enable the farmer to giye repeated dressings, and indeed applications of water, as cheap as the water-meadow, to any form of surface, and to diminish the hazards of one single dressing of manure He concluded a lengthened series of illustrations by urging the necessity of thorough drainage as the necessary preparation of the land for the reception of the manures, which would be brought to them in the most advantageous form by the sanitary improvement of the urban districts (cheers).

Mr. Aitchison said he felt obliged to Professor Guy and Mr. Chadwick for the valuable information with which they had furnished the meeting; and he begged to impress on Mr. Chadwick, when the subject of the sanitary condition of towns was under his consideration, that he would not forget that it was an object of paramount importance to devise some means by which the distant districts of the country might receive the advantage of the liquid manures from large towns. It was his anxious wish also that the Commissioners would not be "penny-wise and pound foolish" when they came to deal with this important question; and that they would do the utmost in their power to extend those benefits, which were at present almost confined to the immediate vicinity of large towns, to every other portion of the country.

Mr. W. F. Hobbs said that he had heard a great deal concerning this system of irrigation which was carried on in the neighbourhood of Edinburgh, and he could not refrain from expressing his astonishment that such enormous crops had been thereby produced. He had recently paid a visit to Edinburgh, when he took advantage of the opportunity to inspect two farms, which contained about 240 acres, and upon which the system of irrigation had been pursued by means of sewage manure. These farms were irrigated eight times in the year, and he ascertained that it was the common practice to let the land so irrigated by what was called in Scotland a public roup, in lots of one acre each, and that the average rent produced was £35 per Scotch acre. The variation of the rents was from £30 to £40 a year per acre. The land was light, and of a black, sandy colour; and by the adoption of this system of irrigation the most extraordinary crops had been obtained. There was no doubt in his mind that by the application of liquid manure to grass lands immense crops could be produced; but at the same time he must say that he very much doubted if it could be so safely applied to corn lands. He was likewise aware that it could be applied with considerable advantage to the growing of roots, but he must observe that it required to be laid on with great judgment and care in the case of arable lands. He was glad that the attention of Professor Guy and Mr. Chadwick had been directed to this important subject; and he was sure that those gentlemen would be supported by the farmers of England in their endeavours to extend the application of liquid manure to the soil.

Mr. Dennison said he had some clay lands on his estate, upon which he had tried night-soil and mould, and which by that means produced wheat-straw six feet high, with a stem as strong and firm as if it were only three feet high. When he introduced the practice on his farm he was laughed at for his pains; but, from the first, he felt convinced, and subsequent experience had confirmed him in the opinion, that its extensive application would produce incalculable good.

Mr. Eve could bear testimony also to the great utility of liquid manure. At the present moment he had two tanks in operation upon his farm, by means of which he distributed the manure upon the land; and no sooner was it delivered, than it seemed to promote vegetation, he might almost say by combustion. Instead of having the sewage water of London emptied into the Thames, to poison the inhabitants and cause their deaths, if it could be conveyed into the country by a line of pipes, or some other cheap mechanical contrivance, he was certain that the farmers, both near to and at a distance from the Metropolis, would gladly become extensive customers. He had tried this liquid manure on land that was worth 50s. an acre; and the difference between the land where it was so applied and that where it was not could at a glance be discerned by the eye. The land presented a variety of colours—green, blue, &c.—as if it were a map. Hitherto we had been asleep and in the dark on this subject, and great numbers were even now asleep in twilight. He trusted, however, that the time had at length arrived when agriculturists generally would cease to be sceptical with respect to it. In Flanders the value of the excrement of every individual human being was estimated at £1 17s. 6d. a-year; but without taking so high an estimate as that, he had no hesitation in saying that at least £450,000 worth of manure might be obtained from the Thames alone in one year. He was well acquainted with the City of London, and was certain that thousands of acres of land might be brought into a high state of cultivation if means were available for applying to it the noxious and poisonous manures that were now lying about Peter-street, Dock-lane, and other places in Westminster and London.

Mr. Sherburne said, when he was first requested

by the Sewage Company to become connected with them, he answered that he was of opinion that their scheme was utterly impracticable; but after conversing with the engineers, and observing its effects at Kew-bridge, he was convinced of his error. At the request of the board of directors, he went down to Manchester, where he saw the system of irrigating with sewage manure in full operation. A barge proceeded up the canal fifteen miles, and delivered the liquid manure as it went wherever it was required, and which, by means of a hose, was distributed more than half-a-mile up the country. He also accompanied the steward of the Earl of Ellesmere over some lands to which the liquid manure had been applied; and the crops were certainly of a most extraordinary description. In the gardens also where it had been used the same results were visible. He was now perfectly convinced of the practicability and utility of the system; and he had no doubt whatever that, by the adoption of proper mechanical means, if the company were duly encouraged, that system might be applied to the wolds of Yorkshire, as well as to Blackheath and the country adjacent to London.

The Rev. Mr. WARREN having made a few observations in reply, and thanked Professor Guy and Mr. Chadwick for the valuable information they had laid before the meeting,

The CHAIRMAN rose and said, that in accordance with the usual custom of the club, he had prepared a resolution, which he begged to submit for their approval, expressive of a definite opinion upon the subject of the evening's discussion. There could not, he thought, be the least doubt of the utility of town manure in the cultivation and improvement of the soil; and the great question seemed to be, as was correctly observed by Mr. Chadwick, the mode of applying it in reference to the question of expense. He hoped when that gentleman was engaged in the consideration of the sanitary state of large towns, he would not omit to consider also the collateral question of the best means of securing the advantages to be derived from the use of the sewage manure, inasmuch as those means might be rendered available not only in the metropolis, but in every large town and village in the kingdom. Nightsoil and urine had already been tried and found so successful in Belgium, and even in China, that no doubt whatever could exist as to its great utility and importance. He begged to submit the following resolution:—

"That the value of town and sewage manure is so satisfactorily shewn by experience as to need no confirmation; that the best and most active form of application for crops is in a diluted state; and that, although there has not yet been sufficient experience to warrant a positive conclusion, a strong case has been made out to prove that town and sewage manure may be most cheaply and economically delivered and distributed by the means of pipes and hose on the plan of the London water companies."

The resolution was moved by Mr. BENNETT, and seconded, and unanimously adopted.

MEETING OF THE HIGHLAND SOCIETY.—IMPROVEMENT OF WASTE LAND.

Mr. Clark, of Ulva, read a Report of the Improvement of Waste Land effected by Mr. George Adam, Easter Beltie, Kincardine O'Neil. Mr. Clark said that the paper which he was about to read he considered of a very interesting nature, inasmuch as it came from a tenant-farmer who had, in improving waste land belonging to his landlord, and of which he held a thirty-years' lease, expended upwards of 1,020*l.* of his own proper funds, and who seemed satisfied in thus investing his capital by the return yearly made in the improved value of the lands. The limits of this report do not permit more than a short abstract of Mr. Adam's communication to be given. The subject of his improvement was a tract called the Shangie Muir, about seventy-four acres in extent, of which a small portion was a quagmire, and about sixty-five of a black moorish soil, with a retentive subsoil, impervious to water; it had never been under the plough, was thickly studded with stones, and bore no herbage except a flimsy coat of heather. Mr. Adam commenced operations by the formation of a sufficient outfall for the drainage, by digging the earth in the line of dykes, and by the removal of earth-fast stones. Between July, 1839, and 1842, he trench-ploughed the whole, using five horses in the plough the first year, and subsequently four horses and four oxen alternately, with seven men and women constantly occupied in following the plough to clear the trench of stones. About four acres required to be trenched with pick and spade, at an expense of 8*l.* per acre. The ground, when cleared of stones, was cross-ploughed, broken with drag and other harrows, and brought to a smooth surface by spade and mattock. This Mr. Adam conceives preferable to burning the surface, which, though raising a good crop at first, is permanently injurious. The first crop—an average one—was turnips, manured with ten bushels of bones, mixed with three times that quantity of peat ashes per acre. The turnips were eaten off with sheep in spring. The ground was then ploughed, and limed to the extent of eight bolls of shells per acre, mixed with as many cart-loads of moss; it was then sowed with oats, and grass and clover-seeds, and produced about three quarters of oats per acre. Some idea may be formed of the extent to which stones had been removed, when it is stated that they furnished materials for 3,716 yards of dykes, 12,000 yards of drains, and the box of a road 730 yards long, by 10 feet wide, and 16 inches deep, and that about 8,000 cart-loads have been laid aside for after use. Mr. Adam's opinion is, that such a farm should be cultivated on a five-shift rotation—1st, turnips, eaten off by sheep; 2nd, oats or barley; 3rd, 4th, and 5th, grass, pastured by sheep or small Highland cattle.

Mr. Maclean, Braidwood, expressed his approval of the course followed by Mr. Adam in his improvements, and his opinion that others would do wisely to emulate his example, and, by reclaiming our waste lands, provide work in this country for the redundant rural population, instead of encouraging their emigration.

THE GIANT SAINFOIN.

Sir,—I now proceed by statistical remarks to demonstrate the superiority of the system I recommend for the cultivation of this stock ; in doing which, I shall simply exhibit the cost and value of the sainfoin crops, as compared with the cost and value of the crops recommended to be displaced, in a way quite consistent with the four-course system of cultivation.

COST OF PRODUCING SAINFOIN CROPS UPON ONE ACRE FOR THREE YEARS.	£	s.	d.
To three bushels of seed, at 25s. per bushel, at which price, I believe, some is offered at present; I, therefore, put it at market price	3	15	0
To cost of drilling the same	0	3	0
To cost of mowing and harvesting the hay and seed crop, at 10s. each time, for three years	3	0	0
To cost of thrashing the seed and taking the same to market, each year 6s.	0	18	0
	£7	16	0

ESTIMATED VALUE OF CROP UPON ONE ACRE FOR THREE YEARS.			
two tons of hay each year, at £3 per ton	18	0	0
To an average for three years of 20 bushels of seed per acre, produced by the second mowing in each year, at 10s. per bushel. There are speculators who will give this price for four years; I, therefore, put it at market price	30	0	0
To value of stover produced by the seed crop, which in quality will be equal to meadow hay, upon an average of years ; each year 30s.	4	10	0
To value of the eddish which will be produced in October each year 7s.	1	1	0
	53	11	0
Deduct cost of production	7	16	0
	45	15	0

TO COST OF CROPS PROPOSED TO BE SUPPLANTED BY INTRODUCING THE SAINFOIN.			
1st. The Turnip Crop.			
To four ploughings, at 9s. each	1	16	0
To four harrowings and four rollings, at 9d. each	0	6	0
To charge for carting and spreading manure	0	15	0
To seed and drilling	0	5	0
To horse and hand hoeing	0	10	0
2nd Crop, Barley.			
To one ploughing	0	9	0
To seed and drilling	0	18	0
To harrowing and rolling	0	3	0
To harvesting crop	0	10	0
To thrashing and marketing	0	15	0
3rd Crop, Clover.			
To seed and sowing	0	12	0
	£6	19	0

SUPPOSED VALUE OF SUCH CROPS.			
To crop of turnips at consuming price, say upon an average	£4	0	0
To six quarters of barley, at 30s.	9	0	0
To value of stover arising from barley crop	0	7	0
To value of clover hay, or the third year, upon an average of years, say	6	0	0
	19	7	0
To cost of production	6	19	0
	£12	8	0

From this it appears that from the whole of the crops displaced during the three years there is a fair prospect of realizing £19 7s., the cost of producing which would be £6 19s., leaving a balance of £12 8s. Whereas, from the sainfoin crops, for the same period, there is a prospect of realizing £53 11s., at a cost of £7 16s., leaving a balance of £45 15s., which is over three-and-a-half times the amount produced by the displaced crops. It may be said that this is mere theory ; and I must frankly confess (however desirable it may appear), that it must be theory for many years to come to the nation at large, owing to the impossibility of obtaining the seed necessary to reduce it to practice. Were it, indeed, possible to import this season 500 times the quantity of seed which at present can be found in the kingdom at large, and to repeat the same in the year 1849, it would even then be found totally inadequate to furnish means for the general adoption of the plan I have shown to be advantageous. Observe, I do not speak at random, but from a calculation in figures, which I will furnish through the medium of your journal, if required. What, however, is too vast for a nation effectually to accomplish, is not too vast for individuals in their respective localities successfully to overcome. Herein I speak from experience. Three years ago I entertained the plan in theory; now I have reduced it to practice. The same path is open to others at less than half its cost to me. I do not, however, regret the cost, for had it been four times the amount it was, it would have been money well expended. I need add no more for the information of the cultivators of sainfoin ; but to others, who may wish to try this species, I will venture to recommend that they procure seed enough to plant a few acres, in proportion to the size of their respective farms ; and then, according as the peculiar properties of the stock shall appear, in their judgment, adapted to the soils they occupy, to increase the cultivation thereof, in a greater or less degree than I have recommended.

I am no bigot to preconceived opinion, nor do I pretend to infallibility as it regards the practice I suggest. I am, however, clearly of opinion, that the discovery of this species will, sooner or later, bring the plant into repute upon thousands of acres where the cultivation of

sainfoin has never been contemplated. I will not say that the system I recommend is calculated to meet all cases; but I do think that such of the land in the kingdom as can be profitably cultivated upon the four-course system will be found amply remunerative under this practice. With the exception of soils naturally averse to the production of the plant, I consider we may take it as a rule that the bulk of the land capable of profitable cultivation under the four-course shift will possess sufficient stamina for the production of the plant in quantities proportionate with the powers which the respective soils may severally possess. After all, it is upon rich, dry soils of any description—soils upon which it would be folly to cultivate the common stock in the usual way—that its superiority will more eminently appear. It is there that it will ultimately commend itself to the intelligent cultivator of the soil; not merely by the ample remuneration it will afford, but more especially by the abundant means it will furnish for the permanent improvement of his farm; not, as is generally the case, at a heavy expense incurred, but with an ample profit realized, which I could abundantly prove had I time to discuss the subject.

There are parties in this locality to whom the properties of this species have long been fully known, but who, nevertheless, have been waiting for years before they tried it, expecting that before now the seed would be procured at an easy rate, forgetting the telling fact mentioned in my last, in reference to the tardy manner in which it propagates its species; forgetting too that its notoriety was extending in all directions, and, of course, increasing the demand for the stock. By some of these I am now told that I have endeavoured to "*trump* up the fame of the stock, both far and near, in order to increase the price of the seed in this locality, where the bulk of it is raised!" I must confess I do not clearly understand the charge. If, however, by the term "*trump*" it is simply intended that I have exhibited the giant sainfoin in the light of a *trump card*, in the game of agricultural pursuits, and represented the holder thereof as being sure to be a winner, I at once plead guilty to the charge. If, however, the term is intended to insinuate that I have mis-stated the facts I have narrated, or put a false colouring upon the statements I have made, I repel the insinuation with contempt. My statements are now before the world; they have been carefully prepared and scrupulously weighed, bearing in mind that I had a forty years' character staked upon their accuracy. If, however, this accuracy be doubted, let the doubter successfully controvert them through the medium of your columns, and I will hold myself guilty of practising imposition, make my bow to the public, and retire into the contemptible obscurity I should richly deserve.

Holding myself in readiness to answer any further inquiry, whether made through your journal or otherwise,

I am, sir, yours, &c.,

THOMAS HINE.

Newnham, Baldock, Herts, Jan. 17th, 1848.

CHEESE DAIRIES OF NEW YORK STATE.

There is an excellent paper in the volume of "Transactions of the New York State Agricultural Society" for 1846, on Cheese Dairies, from the pen of B. P. Johnson, Esq., the President of that institution, together with the answers called forth by the dairymen, who took the premiums of 50 d. and 30 d. offered by the society.

The whole number of cows it appears in the state is 999,400, of which 333,163 are employed in making cheese. The average quantity of cheese made from a cow in Herkimer County is 226 lbs., and in some dairies in that county the average is as high as 680 lbs. per cow. The annual average in Mr. Alonzo L. Fish's dairy for three successive years was 680 lbs. per cow, and in one of these years 714 lbs. per cow was obtained.

Some of our readers may be disposed to question the above statements; but we would remind such, that the product in cheese is not greater in comparison than for a wheat-grower to produce 50 bushels per acre, which result has been achieved in many instances the present summer in Western Canada. It is certainly farming to a profit, to make a herd of 40 cows average each 700 lbs. of new milk cheese in a single season. A superior article of cheese is worth, in the Canadian market, from eight to ten dollars per 100 lbs., which, at the lowest calculation would give a money value for the product of each cow of £14; or £560 for the entire product of the dairy. It would be quite as reasonable for a Canadian wheat-grower to calculate upon growing, in an average of years, 40 bushels per acre, as for a dairyman to suppose he could, without much difficulty, bring his business up to that state of productiveness, that it would average 700 lbs. of first quality of cheese per cow. Both results are practicable, and when produced are not brought about by the mere operation of chance. With a liberal expenditure of capital, and by a pretty large amount of skill, and close attention to business, a farmer may reasonably hope to nearly double the product of his farm, and agricultural operations under such management, and in such hands, will certainly yield liberal dividends to the spirited and enterprising individual who makes the investment. By carefully selecting the cows, and by giving them an abundance of good wholesome nutritious food both winter and summer, a dairy in Canada may without much difficulty be made to average at least 400 lbs. of cheese per annum from each cow. As good cheese can be made here, and at as cheap a rate, as in New York State; and if the price of the article should considerably fall in the markets, it would still be a profitable business, even more so than growing wheat at the average price that that article brings in our market.—The British American Cultivator.

MODIFICATIONS OF THE FOUR-COURSE SYSTEM IN LIGHT LAND ROTATIONS.

The object of every rotation of crops should be to preserve the productiveness of the soil, to insure the largest possible return of produce at the least expense of manure, to keep the largest quantity of profitable stock, and to prevent as much as possible the propagation of weeds. Experience proves, and chemical investigation accounts for some plants being peculiarly favourable to the vigorous growth of other crops of a different species; and thus a judicious arrangement of the various crops may to a considerable extent be modified into a partially self-supplying system of culture, and will ensure a certain degree of productiveness without any expenditure of the fertilizers on the farm. Certain crops, for instance, are known to be exhausting to the soil; or, in other words, the production of them leaves the soil in a worse condition for producing any other crop: others are unfavourable to some crops, but propitious to others; while some, by their consumption on the soil by stock, leave the soil better adapted to the growth of any crop excepting one of the same character as the one consumed.

Another principle, which cannot be lost sight of by the scientific observer of rotations, is that the too frequent recurrence of *any* crop is decidedly unfavourable to the production of the same crop; and however enriching any course of cropping may be, it will soon impoverish the soil, if too long persisted in, in one unvarying manner, simply by their growing lighter and lighter in spite of every application of manure.

The rotations on light soils, while they have the advantage of being capable of sustaining a crop every year without any whole year of absolute rest, have likewise the disadvantage of rapidly decomposing manure; so that under any circumstances they seem to need a supply of manure of some description almost every alternate year. This may appear somewhat startling at first sight, but we should reflect that we apply manure to the land, or in other words, food to the cultivated plants in more ways than by spreading it from the cart, or depositing it by the drill—namely, by the excrements &c. of the stock fed upon it.

Light soil may in a general sense be divided into two classes: sandy loam in all its modifications, which is very productive, easy of cultivation, and yet sufficiently adhesive to prevent the rapid growth of quitch and root weeds; the other, loose sandy soil, which from its lightness and porosity much favours the growth of root weeds, and by evaporation of the moisture and gases is frequently exhausted even by careful cultivation, and, by growing quitch very plentifully, often prevents the successful cultivation of a very desirable crop. Sandy loam, on the other hand, admits of facility of working, and still resists, when pre-occupied by cultivated crops, that rapid development of root-weeds much to interfere with any succession of crops, however rapid.

"To crop green, and crop grey" is the only general rule to be attended to; for if any particular crop has exhausted the soil, the plough may be set four or five inches deeper than usual, and a newly invigorated soil may be raised for the purposes of the succeeding crops.

While the efforts of the light land farmer, on the one hand, must be directed to the gradual deepening of the soil as a means of increasing its fertility, it is quite obvious that to bring up a purely sandy subsoil, abounding in oxide of iron, and quite unadhesive in texture, as a substitute for the true soil, would be a reckless throwing away of every precious means of fertilization. Every combination of crops therefore, on such soils, must have the tendency to admit of the proper clearing of root weeds, or it must be a failure, and the weeds will absorb a very considerable portion of the nutrition intended for the cultivated plants.

The writer therefore confines his attention to the last-mentioned variety of soil, because it requires no small degree of judgment and discrimination to crop judiciously on hungry soils; and as these are the soils he conceives more immediately the subject of attention, he begs to offer a detailed account of the cultivation of a farm of this description of soil, adducing reasons, in passing, for the adoption of the several courses of cropping he will have to describe.

First Year.

1. Spring rye, eaten on by sheep; then turnips, half white and half yellow; manure and bones, drilled flat.
2. Wheat drilled, and hoed.
3. Artificial grasses, consumed by sheep up to February.
4. Chevalier barley—no seeds—hoed.
5. Common barley, with grass seeds.

6. Tares, half soiled green, half dried for fodder; bastard fallow, limed; cleared of weeds, if necessary.
7. Oats, hoed; if necessary, stubble cleared for swedes in the autumn.
8. Swedish turnips and potatoes, ridged, manured.

Second Year.

1. Country barley—no seeds—hoed.
2. Spring rye; turnips, half white half yellow; manure and bones.
3. Oats, hoed.
4. Tares, half soiled, half dried; bastard fallow, limed.
5. Seeds, consumed by sheep up to February.
6. Wheat, hoed.
7. Swedes and potatoes, ridged, manured.
8. Chevalier barley; artificial seeds.

Third Year.

1. Tares, half soiled half dried; bastard fallow, lime or guano.
2. Common barley, without seeds, hoed.
3. Swedish turnips and potatoes, ridges manured.
4. Wheat, hoed.
5. Oats, hoed.
6. Spring rye; turnips, half white half yellow; bones and manure.
7. Chevalier barley and grass seeds.
8. Artificial grasses, consumed by sheep.

Fourth Year.

1. Wheat, hoed.
2. Tares, half soiled half dried; bastard fallow, limed.
3. Chevalier barley, and grass seeds.
4. Spring rye; half white turnips, half yellow; manured, and bones.
5. Swedes and potatoes, ridged, manured.
6. Common barley—no seeds—hoed.
7. Artificial grasses, consumed by sheep.
8. Oats, hoed.

The above is the course of cropping for four years. In the succeeding four red clover is substituted for tares, the swedes and potatoes alternate with the white and yellow turnips, the common barley with Chevalier, and oats with the wheat. It is thus an alternation replete with the completest variations, as well as having a self-sustaining tendency. Thus for every two grain crops there are three green crops and a fallow—two consumed upon the ground by sheep, and one by horses and cows, the dung of which converts the straw of the two grain crops into manure; and a winter fallow and a bastard summer fallow intervene to clear the soil of root-weeds.

Taken in another point of view, it exhibits a constant supply for stock of every kind: white turnips for the sheep from, say, 1st November to 1st January; yellow, to succeed, to 1st March; swedes to 1st May; rye, for lambs and ewes, up to 20th May; artificial grasses with turnips are again ready.

For the sake of clearness, the grass land is kept entirely from the view, as it forms no part of a *rotation* as such.

Horses: Tares from June 15 to August 15, and in seed-pastures to 1st of October; dried tares and straw, with Swede turnips and a little corn, until the tares are fit for soiling.

Cows (supposing *no grass*): Tares from 15th June to 15th October; turnips and straw to 6th April; potatoes up to 13th May.

I now propose to review the crops seriatim, to describe their peculiar qualities, to exhibit their character as affecting stock and fertility, and offer such remarks as may elucidate the *animus* of the system pursued on the farm. It will be clear that the crops grown in the fourth year will better exhibit the succession of crops than in any other; it shall therefore be selected for observation.

1. *Wheat, hoed; following tares and bastard fallow, limed.*—This is an exhausting crop. The difference between an exhausting crop and a non-exhausting or fertilizing crop in general is, that in the one case the plant is allowed to mature its seeds, and is removed from the soil; in the other the plant is abstracted before the seeds are developed, and consumed upon the soil by stock. Thus, wheat, for instance, in flower, contains—

Earthy phosphates, principally phosphate of lime	10.75
Earthy carbonates	0.25
Silica	26.00
Metallic oxides	21.50

Ripe, it contains—

Earthy phosphates	15.00
Earthy carbonates	0.25
Silica	54.00
Metallic oxides	1.00

Thus it appears that the corn, ripe, takes twenty per cent. more of the inorganic constituents of the soil than before the seed is perfect. Tares are another instance, and are selected because the one case exhibits a crop abstracted in its ripe state, the other removed green.

Ripe Tares.

Earthy phosphates	17.75
Earthy carbonates	4.00
Silica	1.75

Tares before Flowering.

Earthy phosphates	14.50
Earthy carbonates	3.50
Silica	1.50

Wheat is, moreover, an exhausting crop, inasmuch as the seed, which contains considerably more of the nutritious gases than the straw, is removed from the soil, while the straw is the only part returned to the soil.

	Carbon.	Oxygen.	Azote.
The wheat contains .	46.1	43.4	0.23
The straw contains .	48.4	38.9	0.04

Thus, while the straw contains a greater portion of carbon than the wheat, the grain contains nearly the whole of the azote. Wheat-growing is therefore an highly de-azotizing crop: it abstracts it in the shape of gluten and vegetable albumen, which it contains in a degree greater perhaps than any other cultivated crop.

The wheat is hoed to present a new surface to the atmosphere, and to prevent at least the full development of the matured root-weeds, for the same principle applies to them—they are more exhausting the greater degree of maturity they attain.

Wheat is likewise a better preparative to the turnip crop than any other grain crop, oats probably standing next. This arises from a dissimilarity in their constituent parts, thus (taking proximate principles for comparison):—

	Mucilage.	Sugar.	Gluten.
Wheat contains	750	0	206 varying.
Turnip contains	7	34	1

Thus, turnips contain the greatest portion of sugar, of which wheat is destitute—the least of gluten, the distinguishing constituent of wheat.

2. *Tares*, one half soiled, one half cut green and dried for winter fodder; then *bastard fallow, cleared, dressed with lime.*—This succeeds barley. The succession of the leguminous to the cereal crops is too well understood to need any explanation here. Besides the tares being cut off and soiled, and thus collecting the ammonia contained in the urine of the animals, instead of inducing its evaporation by being exposed on the surface of the ground, a great saving of food is moreover effected by the soiling process; while the green roots of the tare afford no inconsiderable portion of vegetable matter, as the root of the mature plant only affords woody fibre. The soiling of any crop, besides increasing the quantity of the manure seventy-five per cent., and the quality at least fifty per cent., is a saving of full twenty-five per cent. of food.

It is not my intention to enter at all into the question of radical exudations, but thus much is admitted on this disputed point, that the leguminosæ exude a mucilaginous deposit. The wheat, which in the rotation follows the tares, abounds in mucilage, 750 parts of 1,000; and thus the first principle in all rotations is attained—a partially self-supplying process.

The bastard fallow follows rapidly the scythe: the quitch are mostly destroyed by the powerful effects of the sun. A mass of vegetable matter is immediately urged into the process of decomposition, to enrich the soil with principles necessary for the development of the crop. A slight dressing of lime is added, which, while it assists the decomposing process, affords carbonates to the soil—the principle, let it be recollected, of which the tares deprive the soil; or guano, containing all the principles necessary to vegetation.

3. *Chevalier barley drilled, and grass seeds.*—This crop succeeds swedes and potatoes. As these crops are removed from the soil—one partly, the other wholly—though not from the farm, but are returned to the soil of another field, in the manure, a heavy crop is scarcely even expected, and a disposition generally is evinced to grow the barley coarse. Chevalier, which requires an abundant supply of siliceous matter, and grows considerably finer samples than the ordinary description, is therefore selected.

4. *Rye for spring feed, eaten by sheep, three times freed; land ploughed and worked by Finlayson's drag*, from 20th of May to 21st of June; *sown one-half with white Norfolk turnips, and one-half with yellows, drilled with bones; the land being previously dressed with manure ploughed in; the whole consumed by sheep and cattle.*—The rye, besides being hardy and early, and affording food for the young stock when no other kind of green crop is available, has a tendency to improve the soil. Besides the consolidation of the soil by the treading of the sheep which consume it, and the droppings from them and their fleece abounding in animal matter, the carbonic acid gas they evolve while eating, is absorbed by the soil, which furnishes food to the young plants. It will be noticed by a careful observation of the programme of the rotation, that this is after wheat preceded by a bastard fallow. The greatest objection to rye on very light land is, that it is impossible to clear the land, and that it does not admit of that long atmospheric exposure which it would otherwise obtain. The bastard fallow in the preceding year removes this difficulty: it admits of the necessary exposure, and leaves the land in a state comparatively free from weeds. A slight dressing of manure is given to the rye. This is well expended—increases the food, and thus it is returned by the sheep. The sowing is effected on the wheat-stubble as soon as possible after the harvest is over.

Bones applied to the turnips supply an ingredient to the soil readily obtainable from no other source. I am not alluding so much to the phos-

phate of lime (so much needed by the wheat, and so much abstracted by it and taken from the farm) as to the supplying of gelatine or azote, so necessary to vegetation; though it exists in quantities very minute in some of them. Every process in the rotation is a de-azotizing one. The corn sold off, and the food consumed by the animals, rob the soil of this principle, because it is taken up to supply the animal loss. Every crop contains more azote than the manure made in consuming it; hence, without it is returned in some measure to the soil, every crop must necessarily deteriorate. Bones supply this deficiency; containing about 30 per cent. of gelatinous matter—the source of ammonia or azote.

It will be observed that a rotation of *manure* is contemplated by the system in course of description, as well as a rotation of crops; for it is quite clear that if a system of cropping needs variation because it either abstracts or exudes certain detrimental principles to its own species, so the supply of manure to the soil needs to be varied to meet the destruction or removal of certain portions of food to the plants. The rotation of manure, so to speak, is thus applied:—

Bone dust, consisting of phosphate of lime, phosphate of magnesia, gelatine—one application in eight years.

Lime, supplying the soil with carbonate and sulphate of lime—one application in eight years.

Manure, supplying carbonaceous matter, mucilage, &c.; one application in four years.

Turnips derive a very important part of their nourishment from the atmosphere. The broad expanding leaves are eminently calculated to absorb the gases required; and, in order to do this, they require a considerable quantity of azote to enable the plants to fix the carbon in their composition. In every crop of turnips there is necessarily much waste. The foliage, the fibres, and the remains of the bulbs form no inconsiderable portion of vegetable matter to decompose in the soil; and as this is in the winter, when the temperature is low, the process of decomposition goes on slowly, and only becomes energetic when the temperature rises in the spring—the time when the barley crop is beginning to be developed. A kind of incipient fermentation is generated, and as the matter of the turnip consists principally of starch (which bears so near an affinity to sugar that a very slight disarrangement of its constituents converts it into saccharine matter), and as barley contains .0070 parts of sugar ready formed, it is more than probable that the decomposed turnips supply that ingredient to the barley; as the effects of sheep-feeding supply carbon.

5. *Swedes and potatoes, ridged and manured.*—The preparation of the soil for these crops commences by burning over the stubble as soon as the harvest is over, and doing everything that can be done in clearing the land of root-weeds in the autumn. This lessens the spring work most materially, which is very heavy in loose, light soils; and, indeed, without this it is almost impossible to obtain the land clean by the time the potatoes and swedes should be put into the ground. The loosening and turning over of the soil tends to assist the decomposition of the earthy portions of the soil; the porosity and alteration of position assisting the alternations of heat and cold in a mechanical separation, as well as the attraction of oxygen.

Alumina, a substance perhaps the most of any deficient in soils of the description now under review, is a rather important constituent of the potato. Every crop tends to deprive the soil of it, though to a smaller extent than this; but when so plentiful a supply is needed, it is very desirable to allow a winter exposure to the soil, not in the compact furrow-slice, but in a minute degree of subdivision. As much of the success of the swede depends upon its early development being materially assisted, a principal object is to afford it a supply of the most concentrated manure in its early stages. Hence the manure made during summer by soiling the horses with tares is carted out in the autumn for the swedes, which are sown as near the middle of May as possible. Unlike the potato, for instance, the parent seed contains little matter capable of sustaining the plant in its normal stages: the seed potato maintains a far greater proportion to its produce than the small, almost imperceptible turnip seed. The seed contains mucilage, albumen, and vegetable oil; this enables it to develop its cotyledon leaves, and probably no more immediate and powerful nutritive matter is consequently needed; and this manure, above referred to, with the whole of the woody fibre completely broken down, affords it plentifully. Occasionally I drill 8 to 12 bushels of pigeon's-dung in the drills, supplying carbonate of ammonia, sulphate and carbonate of lime, to the plants; the former a highly azotized compound, necessary at all times to swedes, which contain giuten double in amount to the common turnip. The potato, on the contrary, requires its supply of nutrition at a later period of its development, because the tubers afford comparatively long normal support to the plant. I therefore apply horsedung, in its recent state, so as to admit the fermentation in the drills, rather than in the mixen. It must be borne in mind, that while the swede and potato are exotics, the weeds are indigenous, and, being sown at a period before the date of the germination of the latter, great care is necessary to

keep back the weeds; for this reason I sow in ridges, and give two or three passes of the horse-hoe, and to the potatoes a ridging by the ordinary plough—a practice which cannot, however, be applied to the swedes, because the potato is an under-ground plant, and requires a cover; the turnip is a surface plant, and requires a degree of exposure. The principal part of the swedes and potatoes are removed from the field; this, however, is partly compensated for by the extra dressing of manure given to the crop, and by the sheep feeding off the seeds which succeed the barley crop, which follows them.

6. *Common barley with grass seeds.*—As the common barley differs in composition from the Chevalier, it generally alternates with it, except under special circumstances. Grass seeds are usually sown with the barley, as it manifests less disposition to lodge and destroy the seed than the Chevalier. This, however, varies of necessity as the crop alternates. The remarks offered under the head No. 3 will apply to this crop in a somewhat modified sense.

7. *Artificial grasses consumed by sheep.* — The effects of these upon the soil beyond the droppings from the animals consuming them, the consolidation of the ground by their treading, the carbonic acid gas evolved and absorbed by the earth, are somewhat difficult to trace in their present state. The first aspect in which a ley of artificial grasses for one year presents itself in, is a continuous supply of herbage, derived from a knowledge of the developement and maturity of the several species of grasses. A mixture is, therefore, adopted to secure a succession of new plants to form a pasture as long as possible for the stock; by this means, a greater number of stock can be kept, and in better condition, because there is a more agreeable supply of food and less waste of it.

Italian rye-grass comes first for food at May-day, when the stock are turned upon the ley.

Rib-grass to succeed.

Trefoil follows.

White clover last.

A better pasture can be obtained from a variety of grasses than from any one, independent of this succession of maturity. All grasses differ in some respects in their composition: hence they require different nutritive matter, and do not, as it were, abstract one and the same principle from the soil. All probably contain mucilage, albumen, sugar, and saline matter, but in varying proportions; while clover, for instance, contains more albuminous matter. Now the dung of the animals exhibits only the bitter principle of the plants—tannin and saline matter; hence the mucilaginous, saccharine, and albuminous matter are abstracted by the animals for their nourishment. Consuming the seeds by growing stock is therefore a de-azotizing process, and shows the need of supplying some azotized manure to land, from which this substance is so constantly abstracted.

It must, however, be remembered that as by depasturation no part of the plants is permitted to perfect their seeds, they abstract less nutritive matter from the soil. The breath of the animal, and the decayed vegetable matter supplied by their urine and dung, afford an ample supply of carbon to the soil. It will be observed, on referring to the rotation, that oats are made to follow the depastured seeds. The reason of this is obvious. Oats contain upwards of 4 per cent. more carbon than wheat or rye; and hence the carbonaceous matter meets a crop for which it is adapted, and on which its effects are best calculated to be beneficial.

For example—

	Carbon.
Wheat contains . . .	46·1
Rye	46·2
Oats	50·7

8. *Oats, hoed.*—The artificial grasses are eaten by feeding stock up to October, then by ewes being supplied by the tops of the swedes until probably February, having a small portion of other food if the weather should be stormy. Oats are eminently calculated to alternate with wheat, especially on sandy soils. First, they abound in silica—wheat containing 48, oats 68; while they abstract comparatively little alumina—wheat standing 15, oats 6.

The writer has no hesitation in saying, that on soils of the description above enumerated this modification of the four-course or any other rotation, for at least a period of 8 or 16 years, will be found a decided advantage.

* * * * * *Thirsk, Feb.* 1. M. M.

It has been found that the employment of a species of vetch (*Lathyrus Cicera*) in bread produces very serious consequences. Numbness and paralysis of the lower extremities, and at last death, are the result of the continued use of it. It seems that during the recent high prices in France, considerable quantities of the seed had been used for the purpose of adulterating the flour, and it was not until it had been fatal in many cases that the evil was discovered. The seed of the *Lathyrus Cicera* very much resembles the common vetch (*Vicia sativa*).—*Annales de l'Agriculture.*

COURSE OF LECTURES ON BOTANY IN REFERENCE TO AGRICULTURE.

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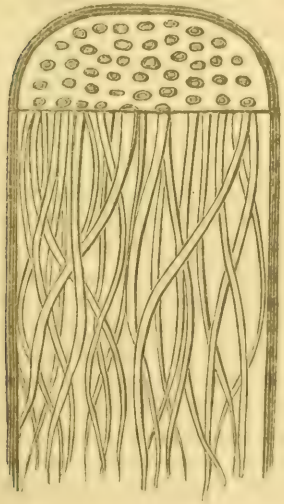
Lecture V.

The very different appearances presented in the sections of an exogenous and an endogenous stem, and the more obvious phenomena characterizing the annual development of the former, were the subjects of our last lecture. The stratified disposition of the tissue of the "outward grower" is so strikingly opposed to the confused and complicated texture of the endogen, that the most cursory examination of the two forms would naturally induce the conclusion that their growth is governed by laws as diversified as their substance. We will not now stay to inquire into the ultimate sources of those differences, but content ourselves with a glance at the already developed stem of the endogen, as we have previously done with that of the exogen, regarding, as in the latter case, its after-growth dependent upon the successive evolution of buds, or, more correctly speaking, of leaves.

A longitudinal or vertical section or division of the stem of an endogen shows the dotted appearance of the horizontal one, figured in our last, to result from the division of numerous little bundles of woody tissue extending downwards in a more or less irregular manner, permeating the cellular matter or pith which constitutes the principal substance of such a stem—at least in its earlier stages of growth.

(Fig. 1.)



These fibres, or, in the larger plants of this class, cord-like bundles, are—like those forming the medullary sheath, and eventually the woody layers, of the exogen—continuations of the woody fabric of the leaves, which, instead of preserving that concentricity of arrangement that regulates the descent of those of the latter class, appear to pass down in a confused manner among the previously formed tissue; hence the title of "inward growers" by which these plants are designated. In England, and other temperate and colder climates, almost all of the species of the class in question, that are capable of vegetating in the open air, are herbs; that is, plants with annual stems, thrown up simply for the purpose of developing their fructification, and dying away when that office is fulfilled, as in the lilies of the garden and the grasses of the meadows. In plants of this kind the stem is simply an elongation of the axis of a bud, resembling the yearling shoot or twig of a tree or shrub, except that it is incapable of producing buds in the axils of its leaves to maintain a successive annual course of vegetation: in a few instances, as in the tiger and fiery lilies, and in some grasses, such buds are formed; but the vital energy of the stem being exhausted by their production and the development of the flowers and fruit, the buds drop off, and vegetate independently the following season, having previously stored up in their succulent scales sufficient nutriment to maintain their separate vitality until the production of roots enables them to draw the more copious supplies necessary to their further enlargement.

The bud from which the flower-stem of a herbaceous endogen elongates is generally underground, attached to some modification of stem, which is in common estimation often confounded with the root of the plant, as is indeed the bud itself; such as we find it in the lily, the onion, and the tulip, in which it is properly termed a bulb, to distinguish it from the ordinary buds. The bulb consists, like the latter, of several scales or of coats involving each other, as in—

(Fig. 2.)

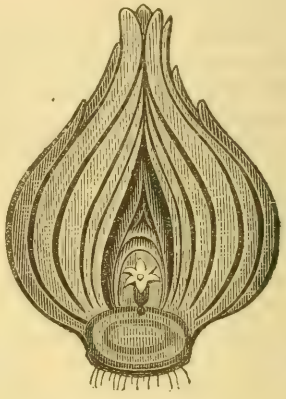
[*Squamose Bulb of Lily.*]

(Fig. 3.)

[*Coated Bulb of Onion.*]

but differs in the succulent character of these parts, which are not, as in the bud, a mere protecting cover to the enclosed shoot, but serve likewise as a reservoir of nutriment, contributing to its after-development, as they do in the deciduous aërial buds just alluded to. The scales or coats consist of the thickened bases of leaves, either rudimentary or developed; and they are arranged one above another, upon a small, more or less conical, axis; from the base of which, when the bulb begins to vegetate, the root fibres are produced, the cone itself being the rudiment of the stem. If we carefully dissect the bulb of the tulip before it begins to vegetate, the plant of the coming season will be found occupying its centre; and on opening the young leaves one after another, the flower, perfect in all its parts, is easily distinguished by the naked eye, of a light-greenish yellow colour, and requiring only the genial warmth of the approaching spring to expand, arrayed in all that gay variety of tint for which this beautiful flower is so much valued.

(Fig. 4.)



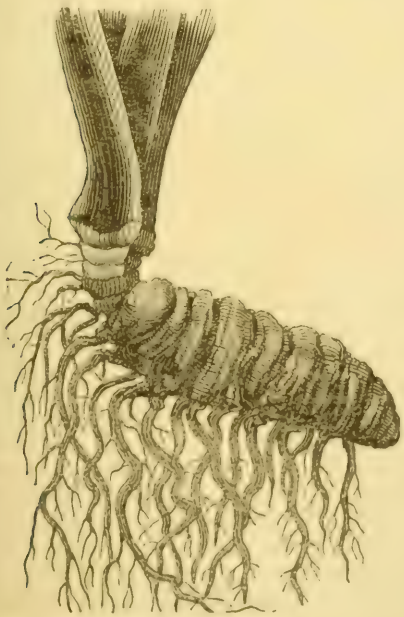
[*Tulip in Bulb.*]

On opening the bulb of the hyacinth, or any other plant of the kind, at the proper season, the leaves and flowers will be found in a similar state; only the latter being individually so much smaller than that of the tulip, their parts are not so distinctly seen in detail without the assistance of a magnifier. The different forms of the bulb arise chiefly in accordance with the form and disposition of the leaves of the plants to which they belong: thus the scattered leaves of the lily adhering only to one side of the stem by narrow bases, produce scales imbricated or lapping over each other; while the stem-clasping leaves of the tulip form coats irregular in thickness, but surrounding the axis—as their bases, when developed, do the stem; and the hollow leaves of the onion form a series of equally concentric coats. The formation of the bulb is, therefore, like that of the bud, dependent upon the free performance of the functions of the organs that produce it. In many bulbous plants the leaves do not make their appearance until after the decay of the flowers; and in those in which the leaves and flowers make their appearance at the same time, a removal of the leaves does not in any degree injure the flower, but always prevents the formation of the next year's bulb. Hence it is always injurious to destroy or break the leaves of the plant in question, and they should never be moved while in a green or growing state, though this is frequently done in gardens, as a sacrifice to neatness, after the

plants have done flowering, and, in consequence, the bulbs become annually diminished in size until lost altogether; indeed this is one of the principal causes of the necessity for fresh importations of many species and varieties of the ornamental kinds which constitute a very considerable branch of the trade of the florist. Thus, too, may be accounted for the failure of the onion crops in many seasons, the leaves being sometimes dried up prematurely, at others beaten down by hail or heavy rains, previously to their having elaborated the supplies necessary to the full enlargement of their bases.

Another modification of the endogenous stem, often confounded with the root, is seen in that of the iris, elongating horizontally by the development of successive buds at its extremity. These buds, as they expand their leaves in an upward direction, have a tendency to lengthen the stem in the same position, but sending down root-fibres from the outside, this tendency is checked, and the horizontal course preserved until the production of a flower-stem; which rising vertically, and dying after its fructification is matured, of course terminates the growth of the point it occupied: not however, in some cases, without having produced at its base one or two buds, which form the commencement of branches similar to that which it terminated. These stems, from their under-ground position and resemblance to roots, are called rhizomæ, and are marked with scars, indicating the places where the successive leaves were inserted,

(Fig. 5.)



[*Rhizoma of Iris.*]

the intervals between which accord very nearly with the cone or plate that constitutes the base of a bulb. In the crocus and meadow-saffron the apparent bulb is solid, and accords with these segments of the rhizoma, which separate successively from each other as they are formed, producing a modification of the stem, which is styled a cormus.

The three modifications of the growing axis of a herbaceous endogen, above described, are infinitely varied in different plants, and are not without their parallels among exogens, the bulb excepted, although under different denominations; but, whatever may be the development of the stem, the absence of stratification or of separable bark, wood, and pith, is always characteristic of the series before us; the central part may, indeed, be wholly cellular, but the woody vessels do not form the cylindrical mass which they do in the exogen: in technical language there is no medullary sheath, and the pithy portion of the centre communicates with that of the exterior by means of irregular insterstices instead of medullary rays.

The arborescent or tree-form endogens are almost exclusively confined to hot climates, where many of them, the palms especially—the most numerous family of woody plants belonging to the class—vie with, and some even greatly surpass in height, the loftiest of our native trees: but the trunk, though extended to the height of two or three hundred feet, is either an elongated bulb or an erect rhizoma, and totally different in its woody structure from that of our oaks and elms. The endogenous tree, too, is rarely branched. The stem of a cocoa or of a date tree is simple, comparatively slender, and cylindrical, not tapering upwards like those of our forest trees; a character partly arising from the uniform development of the terminal bud only, to the total exclusion of those lateral ones, whose annual growth into branches, at different angles of inclination and in different directions, confers the peculiarity of aspect or general outline belonging to the various species of exogenous trees and shrubs. This diversity is not seen among the palms; one large tuft of leaves crowns the summit of the columnar stem, each leaf frequently rivalling in size the branch of a large tree. An unexpanded one beside me, folded like an enormous fan, measures upwards of thirteen feet in length, exclusive of its foot-stalk; it is that of the Talipat palm, *corypha umbraculifera*, the umbrella tree of the island of Ceylon, the full-grown leaves of which are twenty feet long, and nearly as broad, and form a terminal tuft of forty or fifty feet in diameter. The history of the corypha furnishes a striking example of one of the peculiarities of exogenous growth, viz., the limited duration which it involves. In exogens it has been already re-

marked that there is no apparent constitutional obstacle to the indefinite existence of a tree, the new wood being formed outside the old, and the bark splitting or falling off to afford room for its extension; but in the endogen, where there is no separation of bark, and the tissues are more or less intricately confounded in the substance of the stem, the woody tubes added to the mass during each season of development necessarily compress those previously produced, as likewise the little cells composing the rest of its substance; the outer surface, it may be conceived, yields for a time to this compressing force in the interior, and the stem is distended; and so long as the first-formed tissue is capable of distension and compression, the formation of the woody tubes proceeds, and the plant continues to grow: for when distension is checked by the outer tissue becoming rigid, as it does by continued pressure from within and exhaustion of the fluids contained in its cells and tubes, the growth will go on for a considerable period at the expense of compression of the softer tissue of the interior. But this must likewise have a termination; compressibility ceases, no more descending tubes can be produced, and the plant dies from mere inability to develop its buds. "Life," observed Cuvier, in reference to animals, "is a vortex whose centre is death;" the very means by which organization is maintained are those by which its dissolution is effected; and the doctrine is nowhere more beautifully or more forcibly illustrated than in the development of endogenous plants.

The corypha blossoms but once during its life; and the act which perpetuates and multiplies its kind is that which closes its own existence. This fact, remarkable as it might seem to one uninformed on the subject of vegetable physiology, is in accordance with a law that governs, under various modifications, the propagation of the whole vegetable kingdom. Where a plant is checked in its growth as an individual, it almost uniformly appears to endeavour to compensate for the deficiency of its own development by the production of the apparatus for multiplying its kind. Hence we find, in our gardens and orchards, that old and decaying fruit-trees will often produce better than others of the same species in the prime of their growth, as though the production of the floral organs were the consequence of a diminution of vigour in the plant. Indeed, so well is this result understood among cultivators, that when a new species or variety is tardy in producing its flowers, it is a common practice to "starve it," as the phrase goes; that is, by cramping its roots, or withholding the usual supply of water, to induce a premature old age, or at least to check its luxuriance: and although we cannot explain the cause of the blossoming of the talipat being so long deferred, while most other palms, after a certain age, produce their fructification annually, still its appearance, when the tissue of the stem has become so much compressed that the descending fibres of the leaves can no longer develop within it, is by no means mysterious, but a natural consequence. The agave, or American aloe, remarkable for blossoming, according to vulgar error, once in a hundred years, is another example of an endogenous plant flowering from the terminal bud, and dying immediately afterwards, like the corypha. The period of its existence depends, however, upon the rapidity of its growth, and the consequent more or less protracted, but still inevitably increasing, rigidity of the stem, which, though in this instance very short, is still that of a palm-tree in miniature, and subject to the same law prescribing the duration of all the individuals of its class. In very warm countries, where the foliage is very rapidly expanded, a few seasons suffice to bring it to this stage of maturity. The stately flower-stem then shoots upward from 15 to 40 feet in height, the leaves shrivel and decay, the seeds are perfected, and its career is finished. In this climate, the growth being slow, and only a few leaves expanded during each summer, the time of flowering is often protracted to 60 or 70 years. The tuft of leaves which crowns the summit of a palm is replenished every season of growth by the development of a new bud, the old ones dying away; and the trunk itself is lengthened thus periodically, the successive additions to its elevation being formed by the bases of these buds. Now, were at any time this terminal bud to produce flowers instead of leaves, the upward growth of the plant must cease; and it would either die, as is the case in the corypha and American aloe, or continue its existence by pushing out lateral buds, and thus lose its columnar figure, and become crooked or branched. In some few species of palm this latter always occurs, as in the *douma Thebaica* of Egypt and Ethiopia; and it is worthy of remark that, where it does take place, the increase is always by two buds, growing out one on each side of the flower-bud, so that a branched palm is always dichotomous or forked, the branches dividing constantly in pairs, which mode of division is found in *dracœna*, certain species of aloe, and some other arborescent endogens. In general, however, as in the cocoa, date, and others which flower every year, the flower-buds are lateral, arising from the axils of some of the outer leaves, not from the centre of the terminating tuft or crown, which is thus left to develop as a leaf-bud, and lengthen the stem in the columnar manner already described. Whichever of these two forms of growth characterizes the en-

dogenous tree, the habit it confers is very peculiar, and the contrast between it and that of the great mass of exogens no less striking than that of the woody structure of the two classes, as elucidated previously by our figures; not that the simple trunk or forked branches are exclusively found in the former, but that they are of so rare occurrence among the latter as to be exceptions of small account in a collective view.

It is not only in the structure and growth of the stem that the flowering plants present differences which have led to the division of them into the two great classes before us. Distinctive characters of greater or less importance are found in their other organs, that, while their existence enhances the propriety of this our first step in their classification, add greatly to the facility by which the practical botanist is enabled to distinguish the individuals of each from each other, and generally at the first glance. The leaves, however similar in regard to function in both classes, and differing greatly in form in the families and species belonging to them individually, present in the aggregate a contrast that can hardly fail of being recognized by the most superficial observer. Thus, while the veins of an exogenous leaf branch in various directions, as exhibited in the skeleton of a pear-leaf figured in our third lecture, curving, and anastomosing or joining so as to form a complex kind of network, those of an endogenous one are comparatively few, and almost universally run in a parallel direction, and without dividing, from the base to the point of the leaf, being connected by small parallel cross-veins, which likewise evince no tendency to branch. Such veins are readily distinguishable in a broad leaf of a grass, in those of the iris or fleur-de-luce of the gardens, or in those of the leek or the lily. The result of a long course of observation and experiment tends to prove that circulation is less diffuse in the leaves of endogens than in those of the opposite class, and that the passage of the elaborated sap from one set of veins to the other is chiefly, if not solely, effected by the junction of the longitudinal vessels of the two surfaces at the apex of the leaf only. Thus, if the leaf of any exogenous plant be wounded by the removal of a portion of its substance—that is, if a piece were cut off or out of it—the remainder will continue in a healthy state quite as long as a neighbouring leaf of the same age which has not been injured; but if we cut off the upper end of the leaf of an endogen, the remaining portion withers gradually downwards, appearing to derive no further nutriment from the stem or root. The parallel position of the veins renders the foliage of plants of this class far less varied than that of the exogenous series, the form of the leaf depending in a great measure upon the venation. In plants of the latter series, the principal veins separate from the top of the footstalk, or from the middle rib, at different angles in different natural orders, genera, or species; and these angles are found not to vary materially even under the influence of cultivation, and the outline of the leaf is more or less strictly determined by their divergence—a fact that may be readily understood by comparing the leaves of a few plants which approach each other in the general outline, as those of the vine and the mallow, &c. The diversified characters dependent upon this source cannot be expected in plants where the leaf-veins are almost constantly parallel; and hence those of endogens are, with very slight exception, distinguished by a uniformity of outline—a simple, almost rectilinear figure, like those of grass, varying in length and breadth only, and usually tapering more or less to the apex or upper extremity, where the veins meet. Whenever the parallel or rectilinear disposition of the veins is departed from, the rectilinear form of the leaf is no longer preserved, and it is varied to an oval, arrow-shaped, or even, in a few instances, we find it much divided. The compound character of the foliage in one large order of endogens—palms—is at first sight at variance with the ordinarily simple outline of these organs in the rest of the class, but is readily explicable as being derived from it, and the veins in every division of the leaves have the parallel arrangement that so strikingly characterizes those which have them entire.

Another important feature of distinction between the exogen and endogen, in connection with their foliation, consists in the leaves of the former class being deciduous, or falling off after the performance of their functions, while those of the latter are persistent, and wither attached to the stem—a difference intimately associated with their peculiarities of growth. The "fall of the leaf" in the exogen has been variously explained by the writers on vegetable physiology; but when we consider the structure of this organ, and the original continuity of its tissue with that of the stem, as described in our last lecture, there really appears to be no room for question as to its actual cause being the annual deposition or formation of the wood. It is true that in common language we call some exogenous plants "deciduous," and others "evergreens;" but the fall of the leaf occurs, sooner or later, in them all, only that in the evergreen, so-called, it does not take place until the advance of summer, and long after the production of the new ones, while in the deciduous species it occurs in the autumn. In some trees—as in the hornbeam, the beech, and certain kinds of oak—it does not immediately follow on the death or withering of the organ in ques-

tion, these plants retaining their leaves (though no longer verdant, but brown, dry, and rigid) throughout the winter. The descending wood may be readily seen by slitting a branch of the last summer's growth longitudinally, in the latter part of the winter or commencement of spring, when, in some species, it will be found to have made considerable progress, and, indeed, to have completely separated the leaf, or rather the place where it originally was inserted below the now-developing bud, from the living pith and its surrounding sheath, and to have formed a sort of knot. This will account for the earlier fall of the leaf in rapidly and early-growing deciduous trees, such as the willow, lime, &c., than in those of slower and later development. In evergreens the growth is in general comparatively slow. The buds or bases of the new shoots seem to be formed later in the season, and do not begin to extend their wood downwards until the spring is very far advanced; the leaves therefore continue to imbibe nutriment from the stem for a longer period, and, being of a more rigid texture, and perspiring less, as has been experimentally demonstrated, than those of other plants, they are not so soon thrown off; and this will sometimes be the case, even for some time after the new wood has begun to extend and cut off their direct communication with the circulatory system: hence the old leaves of such plants may often be observed to remain upon the stem or branches long after the expansion of the new ones. This explanation of the phenomenon of the "fall of the leaf" is accordant with the views of some physiologists of good authority, and may, I think, be regarded as nearly approaching the actual process by which it is effected as our present knowledge of the structure of the parts will admit of demonstration. Du Petit Thouars remarks:—"If you watch the progress of a tree (of the elder, for example), you will perceive that the lowest leaves upon the branches fall long before those at the extremities. The cause of this may be, perhaps, explained upon the following principle: in the first instance, the base of every leaf reposes upon the pith of the branch, to the sheath of which it is attached; but, as the branch increases in diameter by the acquisition of new wood, the space between the base of the leaf and the pith becomes sensibly augmented. It has, therefore, been necessary that the fibres (vessels) by which the leaf is connected with the pith should lengthen, in order to admit the deposition of wood between the bark and the pith. Now, how does this elongation take place? As the bundles of fibres which run from the pith into the leaf-stalk are at first composed only of spiral vessels, it is easy to conceive that they may be susceptible of elongation by unrolling. And in this seems to lie the mystery of the fall of the leaf: for the moment will come when the spiral vessels are entirely unrolled, and incapable of any further elongation. They will, therefore, by the force of vegetation, be stretched until they snap; when the necessary communication between the branch and the leaf is destroyed, and the latter falls off."

De Candolle seems to consider the evaporation of the fluids of the leaf, and the deposit of solid matter in its substance, the primary cause of its death and fall. He says:—"The increase of leaves, whether in length or in breadth, generally attains its term with sufficient rapidity. The leaf exercises its functions for a while; but, by degrees, in consequence of exhaling pure water, and preserving in the tissue the earthy matters which the sap had carried there, the vessels harden and their pores are obstructed. This time, in general, arrives the more rapidly as evaporation is more active. Thus we find the leaves of herbaceous plants, or of trees which evaporate a great deal, fall before the end of the year in which they were produced; while those of succulent plants, or of trees with a hard and leathery texture, which, for one cause or another, evaporate but little, often last several years. We may, therefore, in general say that the duration of life in leaves is in inverse proportion to the force of their evaporation. When this time has arrived, the leaf gradually dries up, and finishes by dying; but the death of the leaf ought not to be confounded with its fall, for these two phenomena, although frequently confounded, are in reality very different, All leaves die some time or other; but some are gradually destroyed by exterior accidents, without falling; while others fall, separating from the stem at their base, and fall at once, either already dead, or dying, or simply unhealthy."

"It is probable," observes Dr. Lindley, who quotes the two preceding passages, "that both these explanations are required to understand the phenomena of the fall of the leaf; and that it is neither the rupture of the spiral vessels nor the choking-up of other kinds of tissue, separately, which produce it, but the two combined: the one acting principally in some cases, the other in others."

De Candolle's remarks, however, bear reference only to the cause of death in the leaf, not of its fall, and apply equally to those of exogens and endogens; though in the former its disarticulation takes place universally, and in the latter it very rarely occurs. In the beech, and some other trees before-mentioned as retaining their dead leaves throughout the winter, the fact of their doing so is readily explained as an almost necessary consequence of the very tardy development of their buds: they are the latest of our trees in leafing; the buds scarcely presenting any appearance of vitality when

those of many others have already burst into verdure. Is not this strong evidence in favour of the cause of the fall being as we have stated, and of the correctness of the views of Du Petit Thouars? The leaves have fulfilled their office: they have become incapable, by the choking-up of their fine tubes, of drawing any farther nutriment from the stem, and they die; but these vessels still retain their continuity with those of the medullary sheath, and the fall of the long useless organs is protracted, until the vital action of the buds commences, and with it the formation of the new wood. Those who are accustomed to transplant deciduous trees and shrubs are well aware of the fact, that the shedding of their leaves, at or before the ordinary period for so doing, is an earnest of success; that is, it proves that the buds for the next year's vegetation are perfected, and that the new wood is beginning to extend from their bases.

The cause of the retention of the leaves by evergreens, and their early fall in deciduous plants, may be, in some degree, demonstrated by comparing the longitudinal sections, made in the spring, of the last year's shoots of the *aucuba japonica* and of the common elder; when it will be seen that the pith of the latter is much compressed by the extension of the bases of the corresponding buds upon each side of the shoot, while in that of the evergreen no such compression has taken places nor does it until a much later period.

From this examination, too, it may be comprehended how, by the continued downward growth of the wood proceeding from the bases of the buds, the pith of the whole branch would in time be compressed in some trees within a small compass, and, by the pressure of three or four years' growth around it, be perhaps almost obliterated: the pith containing, as its lightness indeed indicates, very little solid matter; which accounts for the absence of that substance in the trunks of large trees. Some physiologists, however, entertain a different opinion on this latter point, conceiving that no alteration takes place in the diameter of the pith after its vesicles have parted with their moisture; but that it remains of the same dimensions in the originally-formed parts, whatever age a tree may attain. Dr. Lindley observes:—

"It has been contended, indeed, by some physiologists that it (the pith) is gradually pressed upon by the surrounding part of the vascular system, until it is either much reduced in diameter or wholly disappears; and in proof of this assertion the elder has been referred to, in which the pith is very large in the young shoots, and very small in the old trunks. Those, however, who entertain this opinion seem not to consider that the diameter of the pith of all trees is different in different shoots, according to the age of those shoots; that in the first that arises after germination the pith is a mere thread, or, at least, of very small dimensions; that in the shoots of the succeeding year it becomes larger; and that its dimensions increase in proportion to the general rapidity of development of the vegetable system. The pith, therefore, in the first-formed shoots, in which it is so small compared with that in the branches of subsequent years, is not so because of the pressure of the surrounding parts; it never was any bigger."

Now, though partly correct, that is, so far as regards the difference occurring in the quantity of pith developed at different stages of growth, the main conclusion arrived at in these remarks is certainly erroneous. The pith *does* decrease in bulk, as the branch or trunk becomes thickened by the accession of new wood year after year; a fact easily demonstrated by a very simple method. Mark, for instance, a strong yearling shoot of a large elder, and cut off a portion of it just above one of the upper pairs of buds, preserving the piece cut off; the second year cut off another portion just above the next pair below, which would then have grown out into branches; the third year another; and so on, preserving as at first the several pieces cut off, and compare the relative diameters of the pith in each, when you will find that in every successive year a great diminution has taken place. Indeed it is rather surprising that a contrary opinion should ever have existed, when it is admitted that the greater density of the heart-wood of a tree, compared with that of its alburnum, is due to this annually-compressing agency.

The vessels which in the endogen correspond to those composing the medullary sheath in the exogen—inasmuch, at least, as they are concerned in conveying nutriment to the leaves—are, for the most part, differently disposed, and, instead of being invested concentrically by each new deposit, receive these in the intervals of cellular substance between them; each bundle of woody matter thus continuing its progress towards the base of the stem, without interfering with those previously formed. Hence the leaves, which have fulfilled their offices and died in consequence of congestion, are still in connection with the vessels of the trunk, and remain attached to it until they decay or are removed by external circumstances. The trunk of a palm tree is always more or less covered with these remnants of its past verdure.

The laws regulating endogenous growth are less known and understood than seems to be the case with the development of plants of the opposite class, in consequence of the absence in Europe of correspondent woody species. There are many apparent and some positive exceptions to the characters,

which are, in the aggregate, assumed as distinctive. The exterior portion of the trunk is generally the hardest, in consequence, perhaps, of the woody matter being chiefly aggregated in that direction; and the outer tissue, corresponding in position to the bark of the exogen, though not in structure, being continuous with the pith or cellular substance of the centre, becomes in the palms successively harder and more firmly bound to the body of the tree by the successive development of the wood with which it is incorporated. In this case only is it that the duration of the plant is limited. In others, as in *dracæna*, the newly-forming wood bursts through the surface from time to time, and finds its way downwards on the outside in the form of roots; a habit that involves a similar indefinite extension of life to that which obtains in the exogen. Indeed, a celebrated specimen of *dracæna draco*, the dragon tree, in the island of Teneriffe, is computed to be one of the most ancient inhabitants of the earth.

The parallel veining of the leaves is not universal in the endogen. In the genus *smilax* (sarsaparilla) the leaves resemble those of exogens, the veins being more or less curved and reticulated; and in *arum*, and several others, there are instances of departure from the general character of these organs both in outline and veining: the leaves in some are deciduous. Still there are certain characters belonging to the two great classes of flowering plants, that render it scarcely possible for one who has studied them to fall into error in the allotment of the species: a fact that will be further remarked upon in our examination of the flower and the seed.

HALESWORTH FARMERS' CLUB.

On Friday, January 21st, the members of this society met to reconsider the present position of landlord and tenant, and how the interest of each would be affected by the provisions of Mr. Pusey's Tenant-Right Bill.

Mr. J. G. Cooper, of Blythburgh Lodge, in directing attention to the first part of the question, stated that he still entertained the opinions which he had brought before the members at a former meeting of the club—namely, that a more general adoption of corn-rents, the granting long leases (and, where practicable, renewing the same some considerable time before they expire), the abolition of all unnecessary restrictive clauses in leases (due regard being had to the rights of landlords), the granting of an allowance to the tenant for all undoubted and absolute improvements both as regards land and buildings, and, in cases where game is preserved, an indemnity to the tenant for injury sustained by hares and rabbits, are severally calculated to promote the mutual interest of both landlord and tenant, and to secure extensive and permanent improvements in practical agriculture. The speaker was happy to observe that he was not singular in many of the foregoing opinions, and, in confirmation thereof, quoted various extracts from speeches of Sir Robert Peel, Lord Brougham, Mr. Shaw, Mr. Bennett, and other authorities.

The necessity for repealing the Law of Settlement, and the adoption of a national rate for the support of the poor; the repeal of the Malt Tax, an alteration in computing the Tithe Rent-charge, and the introduction of the representative system into the county expenditure, were also alluded to, as having a tendency to stimulate agricultural improvements by employment of more capital, labour, skill, and energy, on the part of the occupier; thereby benefiting the property of the landlord, materially adding to the comforts of every party engaged in the cultivation of the soil, and operating to the manifest advantage of every class in the kingdom. It was observed that resolutions had been passed in former years by members of the club in favour of most of the foregoing positions. To show the necessity of introducing the representative system into the county expenditure, the following statistical account of the increased contributions made by the Blything Union towards the county expenditure for nine years, ending the 25th of March, annually, was adduced.

Years.	£.	s.	
1838	1,336	0	Average of 1st three years, £1,736.
1839	1,876	0	
1840	1,996	0	
1841	2,744	0	Average of 2nd three years, £2,705 6s. 8d.
1842	2,828	0	
1843	2,544	0	
1844	2,957	0	Average of 3rd three years, £3,247 17s. 8d.
1845	3,108	10	
1846	3,678	3	
£23,067	13	Average of the nine years, £2,563 1s. 5¼d.	

Expenditure in 1846 was £2,342 3s. beyond the year 1838. The average of last three years is £1,511 17s. 8d. above the average of 1838-39, and 1840.

The various clauses of Mr. Pusey's Tenant-Right Bill were then submitted to the meeting in consecutive order. To the provisions of this bill, with a few exceptions, all parties present subscribed. The concluding clause, however, was strongly objected to, because it rendered the bill permissive only, instead of making it compulsory. The following resolution was unanimously adopted:—

Resolution.—"That in the opinion of this meeting, amongst the valuable suggestions brought forward by the introducer to improve the present position of landlord and tenant, the establishment of a simple and well-defined law to secure to out-going tenants a fair compensation for all unexhausted improvements is of the greatest consequence. That, although Mr. Pusey's Tenant-Right Bill is correct in principle, as regards most of its provisions, and calculated to promote the object desired, the members consider that by the present construction of one of its clauses the bill becomes *perfectly useless;* it being preferred, that 'nothing in the proposed Act should prevent any agreement between any landlord and tenant *exempting themselves* from the operation of the said Act. —Suffolk Chronicle.

POOR PRICE TO FRED. FARMER OF THE COPELANDS.

Dear Fred,—Oh! what an awful thing the flunzy-gunzy is! It's all the go in this part of the country; everybody has it, and I have had it three times and a half—ay, and should have had it four times had I not taken precautionary measures. I kicked the doctor out of the door, and sent all his medicine-bottles, pill-boxes, and powder-papers after him.

When I got into the fold-yard, there was everything topsy-turvy, hicklety-picklety, and backside-foremost. I scolded one man, till between him and the horse the cart was all smashed to pieces. I nearly knocked all the senses out of the man that was boiling linseed and Indian meal, because I thought the meal had not been steeped enough. Mind always steep your Indian corn (in whatever shape you use it) for twenty-four hours before boiling; it swells it, and makes it more easy of digestion.

I believe that, next to linseed, Indian meal is the best and cheapest article for feeding, without taking into consideration the extra value which it must impart to the manure, one of its principal component parts being ammonia.

One of the cleverest chemical professors of the present day is of opinion that ammonia applied to the land in any shape is useless, on account of the large quantity which already exists in it. We cannot doubt that the earth contains a great deal of alkali in all its forms; and from the amount of ammonia which that learned chemist has stated to be present in the soil, we might very naturally conclude that to apply it artificially was quite useless; however, we must also believe the evidence of many practical men who have applied it, and found great benefit to plants of nearly every description arising from its application. It appears that the young plant springs away both quicker and healthier when treated with it. I can only account for it in this way: that the ammonia—though there may be any quantity in the earth—is not in a state to be easily taken up by the rootlets, but is, as it were, extracted by them merely in such proportion as is requisite for its growth; while, on the other hand, being applied artificially in a more soluble form, consequently in a fitter state for imbibation, the plant luxuriates in it, and springs away, strong and healthy, and better able to withstand the cold and other hindrances to its strong and speedy growth.

But I have not yet said anything with respect to the effects Indian corn will have in feeding. It would be foolish to compare it with linseed, or, perhaps even, oil-cake, if given in like proportions; but you will please to remember that it is very much cheaper (and no doubt if it were more used would be still more reasonable), consequently much more can be given than can well be afforded for articles so expensive as linseed and oil-cake. For my own part I think it best to use the corn and linseed together; the former is of a binding, the latter of a laxative, nature; so that they correct each other.

But I have a still better reason for using Indian meal. After having been steeped so long, it has, of course, taken up a great quantity of water. Well, it is just the water that is my best reason for using it. You are probably aware that the homœopathic system is all the go just now. If it is good for man, it cannot be bad for beast; therefore, give them plenty of water, for, you know, it may cure some fell disorder long before it breaks out!

I have, you perceive, been endeavouring to show you some of the good qualities of Indian corn; but on reading what I have written, I am sorry to say I find I have done no great shakes; yet I have shaken my goose-quill most awfully, and as for my senses, you will, of course, have noticed before this, that if they are not gone wool-gathering, they are at least very much shaken in their exalted abode.

I am, however, no Shaker; but merely belong to the unfortunate sect, of whom the song says—

"We're a' shaking,
Shake, shake, trembling."

Old Cuthbert Corkdrawer, who used to live hard by, was a terrible fellow for shaking. He shook so tremendously at one time that he quite shook his old age off, and there is no saying to what age he might have lived had not a serious accident befallen him. It so happened that one very sultry day, when the thermometer was—dear knows where, as he was walking down the hill of life, he was unfortunately crushed to death by the weight of years that had accumulated on his head.

I should have written you a longer letter, dear Fred; but, as I said before, I have had the flunzy-gunzy, and therefore don't feel quite so capable of the undertaking as I otherwise should be. I therefore remain, Yours, very truly,

Poor Price.

THE CHEMISTRY OF LIFE; OR, THE INFLUENCE OF VARIATIONS IN THE QUANTITY OF AIR AND FOOD IN MODIFYING THE HEALTH OF ANIMALS.

(*Abstract of a Lecture delivered at the Royal Veterinary College, Oct.* 11, 1847.)

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The nature of the elements entering into the constitution of an animal body was first considered; then the relationship existing between the organic and inorganic kingdoms of nature pointed out, the lecturer observing that nature does nothing abruptly. Where the one kingdom ends and the other begins is not broadly marked. "'Tis hard to sever the chain that binds Prometheus to the rock." It is evident that, before the crude materials of the soil can become the luscious and tempting fruit or the beauteous flower, the esculent and nutritious grain, or the grass that clothes the field in rich abundance, they must undergo certain transformations, become mixed and commixed; and, although science may fail to explain how these changes are effected, nevertheless her laws enable us to approximate truth. The change of matter from the inorganic state to that of organic is constantly going on; and, when life has ceased to exist in an organic body, the elements of which it was composed again became inorganic.

In the vegetable the elements first become organized. Here the more refined and complicated changes occur, altogether too subtle to be detected by art, and only occasionally to be imitated, by which fit alimentary matters are prepared for the animal. Here what are called proximate organic principles are formed, which, by assimilation, become parts of the animal.

The connection between the vegetable and animal kingdom was then dwelt upon; likewise the division of food into albuminous or nitrogenized, or the truly nutritive principles; and the respiratory or non-nitrogenized, or heat-giving principles, according to the arrangement of Baron Liebig.

The composition of the atmosphere was next shown, and the different properties of its constituents demonstrated, its uniformity stated, and also its admirable adaptation to the economy of nature. The otherwise too energetic oxygen is checked by the passive nitrogen, while the watery vapour and carbonic acid there existent have their respective uses, each contributing to the perfection of the whole, and yet all are but mechanically mixed together, not chemically combined.

The changes produced in the pabulum by respiration were explained, and the compensating process stated. Essentially a portion of the oxygen is removed from the atmosphere, and carbonic acid gas and watery vapour substituted. These, with nitrogen derived from ammonia, become the food of plants, in the cellular tissue of whose leaves those beautiful transmutations occur which result in the formation of certain organic principles, and at the same time oxygen is eliminated, thus restoring that which was removed by the breathing of animals.

Now, the amount of oxygen removed from the air during respiration will vary, it depending on certain conditional circumstances, such as the number of respirations taken in the minute, the temperature of the air, the state of the body, conformation of the animal, exercise, diet, &c. And since no portion of oxygen abstracted is given out in any other form than in combination with carbon or hydrogen, and as these elements in a state of health are replaced by food, it follows that the amount of nourishment required by an animal is in direct ratio with the quantity of oxygen absorbed.

It may give some idea of the immense consumption of oxygen by animals if we take the following computation by Boussingault:—

An adult man consumes 13·9 oz. carbon daily in his food, and requires 37 oz. oxygen for its conversion into carbonic acid gas. A horse consumes 97½ oz. (more than 8 lbs. troy) of carbon in 24 hours, and this requires 13 lbs. 3½ oz. oxygen for the same purpose; while a cow consumes 69·9 oz. carbon (nearly 6 lbs. troy), which calls for 11 lbs. 10¾ oz. oxygen.

From this circumstance alone we see the necessity of ventilation in places where animals are kept; and the danger that results from crowding them together is heightened by the excretions being allowed to accumulate and to throw off their pestilential gases, which are necessarily evolved by decomposing bodies. Hence, in ill-ventilated stables we meet with the compounds of hydrogen, sulphuretted and carburetted; ammonia and its carbonate, and the hydrosulphate, besides the carbonic acid and free nitrogen given off by respiration; and, from the inhalation of these compound gases, heated as such an atmosphere necessarily is by the congregating of animals, we have frequently inflamma-

tion and other diseases of those all-important organs, the lungs, set up, which, from the debility induced, is followed by farcy and glanders, and this more especially should the predisposing causes of hard work and bad food co-exist. Or we have ophthalmia, both local and constitutional, engendered; and often that insidious but too frequently fatal disease, phthisis pulmonalis.

This conversion of oxygen into carbonic acid, plain and obvious as the fact itself is, and all-important as it also is to the animal economy, has, unfortunately, awakened much difference of opinion among philosophers as to the manner in which it is brought about. Doubtless the change is effected through the medium of the blood; and the older chemists taught that the venous blood being returned to the lungs surcharged with carbon, this united in the lungs with the oxygen of the air, and was expelled as carbonic acid gas. This theory, simple and explanatory as it really is, unfortunately involved some insurmountable objections; and it at length gave way to that of absorption of oxygen by the blood it its transit through the lungs and the gradual conversion of it into the compound gas—carbonic acid—during the circulation. Yet there was still much that remained inexplicable, until Liebig advanced the beautiful theory of the iron in the hæmatosine being the carrier of the oxygen. Thus this metal, it was taught by him, in arterial blood existed in the state of peroxide of iron; but, as it yielded up its oxygen it gradually became converted into the carbonate or protoxide, and, as such, it was said to be found in the venous blood, when in its passage through the lungs, by endosmose, a displacement of the carbonic acid by the oxygen of the air took place, and thus the necessary change became effected.

Unfortunately, Liebig himself now seems to doubt the validity of this theory, for he makes the phosphate of soda met with in the blood the carrier of the carbonic acid out of the system. "There is," he says, in his lately published work on the "Chemistry of Food," "no known salt, the chemical characters of which approach more closely to those of the serum of blood, than the phosphate of soda; there is none more fitted for the absorption and entire removal from the organism of carbonic acid." So that the alteration in colour which the blood undergoes in its conversion from venous to arterial is not so much dependent on the iron it contains as on the saline matters which react on the hæmatosine.

Dr. G. O. Rees has lately stated that the venous corpuscles contain a fatty matter with phosphorus, which, on coming into contact with the oxygen of the inspired air and undergoing combustion, furnish carbonic acid, water, and phosphoric acid. The first two are expired, the last unites with the soda of the blood, forming a tribasic phosphate of soda, which salt has the property of so acting on the colouring principle of the blood—the hæmatosine—as to produce in it the bright arterial colour. Mulder contends that the carrier of the oxygen is protein, the starting-point of all the tissues of the frame, and which, in the passage of the blood through the lungs, becomes converted into the bin and trit oxide of this animal principle. It is certainly to be regretted that, as yet, scientific men are by no means agreed on this point.

By the same means the conversion of oxygen into carbonic acid, the heat of the body—animal heat—was accounted for; it being a well-known fact that, whenever union takes place between oxygen and carbon, heat is eliminated; and this is the same in amount, whether the combination of these elements be rapid or slow.

Ingenious as this theory doubtlessly is, and supported as it has been by the splendid talents of Baron Liebig—for its origin is really with Laplace and Lavoisier—it does not account for all the heat generated in the living body. Dulong has proved that the combustion of the carbon of the food would account for only one-half the heat evolved by a carnivorous animal, and but for seven-tenths of an herbivorous one. And even when the combustion of hydrocarbonaceous matters, taken in as aliment, according to the views of some chemists, is accepted, there yet remains one-fourth of the heat generated to be accounted for.

To meet this formidable objection, and to make even life itself dependent on the physical forces, it has been proposed to call in the aid of electricity, which, by becoming intercepted in its passage through imperfect conductors, gives rise to calorific vibrations. Now, there is little doubt but that the nervous energy has much to do with the bringing about of the union of the oxygen of the air with the carbon and the hydrogen of the food during the nutritive and reparative processes carried on by the capillaries, and heat is then given out; and there have not been wanting those who have considered these forces identical; and if it be asked, where is the source of the electricity which is constantly being developed in the animal frame? I suppose reference must be made to the free acid (the lactic) contained in the muscles of the body, and the alkaline fluid existing in the blood-vessels and lymphatics, the tissues of which being permeable, contact, if not union, takes place, when the conditional circumstance is established to produce an electrical current, it being well known that whenever chemical action takes place this principle or force is eliminated. The nerves now become the conductors of this force, which is exerted to carry on those func-

tions necessary for the maintenance of life; and the brain is its grand depository or organ, whence it is transmitted to all parts of the body, which, like "an electric pile," says Sir William Herschel, "constantly in action, may be conceived to discharge itself at regular intervals, when the tention of the electricity developed reaches a certain point."

Thus much for the electro-physiological theory; but it must, at the same time, be confessed that as yet the identity of the electric and nervous fluids is not proved. Prefessor Matteucci, having deliberately weighed all the arguments advanced, and repeatedly performed the experiments said to be confirmative of their oneness, has come to this conclusion, "that in the actual state of science, with the means of experimenting which we possess, we do not find any sign of an electric current in the nerves of living animals." Similarity, therefore, is not identity.

The effects of accumulated carbonic acid gas in the air having been explained, other adventitious gases that may occasionally become diffused through the atmosphere were alluded to, especially sulphuretted hydrogen, which is so generally evolved during the decomposition of organic substances, the same compound being given off from graveyards, cesspools, &c., and hence the necessity of drainage and extramural interments, since the unconscious dead have slain their thousands. The effects of vapours disengaged from copper smelting-works and the direful effects of malaria were also commented on, endemics and epidemics frequently owing their origin to pestilential matters thus disseminated through the air. As illustrative of this, the peculiar change in the atmosphere that occurred during the prevalence of cholera was referred to, as recorded by Dr. Prout, and the effects of seleniuretted hydrogen on the organism, as given by Berzelius. Neither was it impossible nor improbable but that the epizoötic which had for so long a period existed, decimating our herds, and baffling all endeavours to stay its progress, with the diseases affecting the vegetable kingdom, has its origin in the same cause—the generation of a morbific virus which may be corrected or destroyed by chemical agents, such as chlorine or carbon. The *modus operandi* of these elementary substances on the fœtid gases was then exhibited.

Before entering on the consideration of food, a cursory review was taken of the function of digestion, and the changes which alimentary matters undergo were briefly explained. There can be no doubt but that the less alteration required to be effected in the food taken into the stomach, the less will the vital powers be called upon, and the less complicated will be the required apparatus; hence the comparative simplicity of the digestive organs in the carnivora as compared with the herbivora; in the former the process has been considered as gastric, while in the latter it is, doubtlessly, partly intestinal.

The basis of the food of the granivora may be viewed as amylum or starch, which is tasteless and insoluble; but in the mouth it becomes changed into soluble and imperfectly formed sugar, or it undergoes the first transformation towards this. This appears to be effected by detached portions of the mucous membrane acting the part of a ferment. Bernard separated from the mouth of a dead horse several shreds of the mucous lining, and found that after prolonged desiccation they still possessed the power of transforming starch into sugar. Lassaigne contends that farinaceous matters only become saccharified in the small intestines, from the action of the pancreatic juice on them; but the majority of experimenters are in favour of the change first taking place in the mouth through the influence of the saliva, and which becomes perfected in the stomach and intestines.

In ruminants it is probable that the food is similarly acted upon while retained in the first and second stomachs. In the third it is said to undergo compression; and in the fourth a peculiar acid is met with, which was stated to be the hydrochloric, derived from the commom salt of the blood, the chloride of sodium; it becoming an hydrochlorate of soda when dissolved. More recent investigations have, however, determined it to be lactic acid, a non-nitrogenized compound, consisting of C6, H4, O4, analogous to acetic acid, and with which it was at one time confounded, but from which it is distinguished by its dissolving phosphate of lime. The same acid—the lactic—is met with free in the muscles, and combined in milk; and when gum, sugar, and starch are brought in contact with animal matter undergoing change, they are converted into this peculiar acid.

"These substances, gum, sugar, and starch, are converted in the blood," says Liebig, "into lactates, which are destroyed as fast as they are produced (the lactic acid being employed to support the respiratory process), and which only accumulate where the supply of oxygen is less, or where some other attraction is opposed to the agency of that element."

The composition of the various secretions, which, entering the intestinal tube, take part in the process of digestion, as the pancreatic, the biliary, and the enteric, were next given.

How the function of secretion is carried on, like many other vital phenomena, appears to be ill understood. Each gland seems to possess the power of selecting from the blood those elements which

make up its peculiar and characteristic secretion. Now, as this is effected by endosmose, it has been suggested to be referrible to the different degrees of permeability in the membrane or cell in which the sanguineous fluid is for a time retained; and, possibly, the tortuosity given to the vessels assists in promoting both the detention and the separation. As the manner in which the various secretions are separated from the blood is at best conjectural, so are the uses of many. Thus the pancreatic juice was said to resemble saliva, except that in it were found no sulpho-cyanides. Now, however, it is stated to contain a little free acid; and its use is supposed to be that of separating the pepsin from the chyme, which is necessary for its conversion into chyle.

The use of the biliary secretion appears to be only a very little better understood. That its removal is of considerable importance to the living organism is unquestionable, since by its withdrawal the blood becomes depurated; moreover, it has not been met with in the egesta. It is formed from the effete nitrogenised tissues, and is often found very complex in its nature. Tiedemann and Gmelin extracted no less than twenty-three different substances from ox-bile. This complexity will not so much surprise us if we view the liver as an excretary organ as well as a secreting one, its function being that of assisting the lungs to eliminate hydrogen and carbon from the system; hence, whensoever the latter are unable to perform their part in the evolution of these elements in the form of carbonic acid and watery vapour, this organ, the liver, becomes affected. In this way its fatty degeneration may possibly be accounted for, as well as its condition in the first stages of rot in sheep, and many other changes to which it is obnoxious. On the other hand, if the bile be prevented from flowing into the intestines, animals become emaciated, and ultimately die.

Its principal and essential office appears to be that of neutralizing the acid chymous mass by the soda it contains in combination with an animal acid called the choleic, and at the same time causing it to separate into two parts, chyle and excrementitious matter. The first named, being the soluble nutrient parts, is taken up by the lacteals, carried into the receptaculum chyli, and afterwards, in its passage through the lungs, it becomes converted into blood, from which all parts of the body are formed.

There can be no question that it is of the first importance to keep this last-named fluid in a sanitary state; for, although the doctrine of humours has been for a long time repudiated, we seem to be fast returning to it (robbed, it is true, of its absurdities); yet a vitiated state of the blood will induce an alteration in both the solids and fluids of the body; while it will also be influenced both by the food we eat and the air we breathe.

To improper diet, or a mal-assimilation of the ingesta, may be referred the formation of intestinal calculi. Three causes may be said to be in operation to produce these concretions:—

1st. *A want of proportion between the proximate principles of the food.* This will give rise to the first kind, the ammonia-magnesian phosphate calculus. And hence the reason why millers' horses, from being fed on refuse bran and pollard, are very liable to these formations.

2nd. *Bad or innutritious provender.* This will produce the oat-hair concretion; poor and thin oats, having a considerable quantity of hair at the extremity of the grain, giving rise to this formation.

3rd. *An animal being a foul or voracious feeder.* To this we trace those masses met with in the intestines vulgarly designated dung-balls; elsewhere called by me mixed calculi.

But it must not be thought that each kind of calculus originates precisely and only in one or other of these three ways. The first division may be truly applicable, but in the formation of the second kind the first cause obtains also; and in the third all three causes are in operation, and the accumulations, therefore, become very heterogeneous.

Tympanitis, or hoove, is an affection wholly dependent on changes induced in the food. During healthy digestion gaseous elimination does not take place in the alimentary canal; all that occurs is a solution of the caseous and albuminous parts of the food, by which they are rendered fit for absorption. But let the vital force be stayed, or the function of digestion rendered abnormal, and then precisely the same changes follow in the food that would occur in it out of the body; in other words, we have fermentation set up, with its attendant phenomena.

The stages of fermentation are three:—1, *Vinous;* 2, *Acetous;* 3, *Putrefactive.* During the first stage we have carbonic acid gas evolved in large quantities, and then the compounds of ammonia will be our correctives, from their forming definite solid compounds with it. But it very often happens that the aid of the practitioner is not called for until that transformation has been set up in the ingesta which is characterised by the disengagement of the fetid compounds of hydrogen, and then we avail ourselves of the use of chlorine, which immediately decomposes them.

When proper care has not been exercised in the making of hay, it is well known that certain changes occur in it; and a very general result is the gene-

ration of so much heat that the rick "fires," as it is called. But should this not take place, we have the hay in that state designated "mow-burnt," when we have fermentation induced in the saccharine matter, which becomes converted into alcohol and carbonic acid :—

				C	H	O
1 atom sugar.....				12	12	12
	or	C	H	O		
4 atoms alcohol		8	12	4		
2 atoms carbonic acid		4	0	8		
				12	12	12

The integrity of the vegetable matter being thus destroyed, on the application of any disturbing force, and provided the circumstances be favourable to it, it quickly runs on to the next stage of fermentation, the acetous; and in the stomach are the conditions necessary for this transmutation; namely, an elevated temperature and oxygen taken in with the saliva. Moreover, decaying vegetable substances more readily yield up their saline constituents, soda and potash, than others do; and these, combining with the acetic acid, form soluble acetates, which pass on to the kidneys for elimination. Hence we obtain a clue to the origin of many nephritic diseases; the function of the kidneys being that of "preserving the equilibrium in the quality of the blood by the removal of products resulting from the change of matter, as well as substances that would affect the normal character of this fluid;" therefore, in the urine, the soluble salts of the effete materials of the frame are met with, the insoluble ones being thrown out with the egesta.

In like manner, horses that have been long kept in marshy districts contiguous to the sea often become the subjects of œdema, general or local, and sometimes of farcy, and other diseases resulting from debility, diuresis being a general accompaniment. It may not be too much to look to the origin of these in the saline matters there abounding, and which, being partaken of in undue quantities, induce functional derangement leading to organic changes.

The disease termed diabetes mellitus unquestionbly originates in a peculiar condition of the food or the change induced in it. Although, perhaps, this form of diabetes is not so commonly met with in the horse as diabetes insipidus, the cause of which has probably been already traced to the existence of the acetates in the provender; yet that sugar should exist in the urine of our patients is not at all surprising, when we reflect on the nature of their food, and that farinaceous matters quickly undergo conversion into this principle. Horses, says Majendie, that have been fed exclusively on oats will be found to possess sugar in their blood; and, if a solution of starch be injected into the veins of an herbivorous animal, it soon becomes so completely transformed into the saccharine principle that iodine fails to indicate the presence of the least particle of starch.

Oats that have been too highly kiln-dried, and especially after they have become wet by a sea voyage, are frequently productive of derangement in the urinary organs, the cause of which is obvious: those changes have been induced in the grain which interfere with its assimilation; hence digestion becomes impaired, and, for aught we know, some deleterious principle has been developed which is passed onwards to the kidneys for elimination.

Wheat and barley, it is well known, unless caused to undergo germination, frequently become the causes of disease; the one producing laminitis as a sequela of gastritis, and the other giving rise to depilation of the skin. This last named admits of an easy solution, if we view the lining of the stomach and the envelope of the body as the continuation of one and the same membrane.

The formation of urinary calculi may also be traced to the food. The water drunk by animals has generally been considered as the source; but it is by no means proved that in those localities where lime is more abundantly met in water—as Matlock, Scarborough, Carlsbad, and other limestone districts—calculous affections are most prevalent; whereas we do know that animals kept on any of the lime-plants for a long time, or pastured where lime has recently been laid, become the subjects of these accumulations. Nevertheless, excess of lime in water will readily furnish the requisite calcareous matter; and in our patients these formations meet with a ready solution. The salts of lime are carried to the kidneys for excretion, and, diseased action being set up in them, the urine is retained in the pelvis of these organs or in the bladder, and becomes ammoniacal from the urea undergoing transformation into carbonate of ammonia on the contact of water :—

	C	H	N	O
1 atom urea.....	2	4	2	2
2 atoms water.....	0	2	0	2
2 atoms carbonate ammonia	2	6	2	4

By the addition of the salts of lime to this, immediate decomposition takes place; a carbonate of lime, the usual constituent of these concretions, being thrown down. And this transformation of urea into carbonate of ammonia is facilitated by the presence of mucus in the urine, a condition very commonly existing in animals.

Even red water in cattle, a disease among the *quæstiones vexatæ* of the bovine pathologist, receives some elucidation by a reference to an alteration which takes place in the biliary secretion; while

dyspepsia, with its consequences, more particularly as it is productive of affections of the skin, can alone be explained by the alterations that occur in the food, or the function of digestion. Hence the necessity of dietetics in common with hygiene, or the regulation of external conditions, forming parts of the curriculum of the veterinary student.

The lecturer closed by offering some advice to the pupils as to the arrangement of their studies, adverting to the different position in which they are placed from those who have preceded them; the community justly expecting more from the veterinary surgeon now than when instructions based on science were not afforded him. Each has his duties to perform, and the value of co-operation is too obvious to need commenting on. Unity of purpose, connected with a well-devised plan, he said, is imperatively called for in the pursuit of every science, and we must labour if we wish to obtain knowledge, since "there is no royal road to it."

Every increment, however, fructifies in its turn, and contributes to swell the general amount; and thus it is that knowledge proves accumulative to its possessor. You know the alchemists untiringly sought for that which would transmute everything it touched to gold; but each of us, fortunately, possesses this talisman, if he will only use it, and it is comprised in one word—industry. Nevertheless, this too has its adjuvants; for, unless method be adopted, much labour will be uselessly expended.

Principles are to practice what the fountain is to the stream, or the foundation is to the building, which, if not securely laid, will, on the day of trial, fail to support the superstructure. Many there are who affect to contemn science: with such persons we profess to have no feelings in common. It is in seasons of emergency that the advantages resulting from the possession of sound principles will be experienced. In your after-persuits in life you may have to contend with these persons; but, depend upon it, the struggle between truth and science, and ignorance and empiricism, is as the morning dawn contending with the shades of the passing night. For a little while, perhaps, the former may be obscured; but the brightness of the noontide light will assuredly appear, even though it may seem to tarry.

Be solicitous, then, to possess true principles, and be assiduous in your acquirement of them. Set your standard high, and in proportion will be your aspirations. But should you, at any time, unfortunately feel disposed to become vain of your acquirements, look to those above you: this, while it checks mental pride, will, at the same time, awaken in you a fresh spirit of emulation.

On the other hand, do not despond if so be the progress you make does not equal that of others. All, it is well known, have not the same abilities. Yet the mind, like the body, becomes strengthened by exercise; and perseverence will enable you to achieve that which otherwise you could not have accomplished. Rarely is it the case that the industrious man fails: when he does, it is the exception to the rule.

Those who feel that they have this difficulty to contend with will do well to vary their studies. When the mind is fatigued by the pursuit of one division of science, turn to another. The relief thus afforded will be found to be great; and, although this method must not be allowed to take the place of continuous study, yet will it often prove the means of invigorating thought and of furnishing the mind with valuable information.

In conclusion, there are two little words, big with importance, I would commend to your notice —try and trust. Let not the soul-impoverishing thought for a moment obtain that it is no use to try. Few of us know what we may accomplish without trying; and a well-grounded confidence in our own abilities, coupled with a reliance on that Power without whose aid all our efforts will prove unavailing, will enable us to remove mountains of imaginary obstacles, and render that facile which before appeared insurmountably difficult. Thus it is that the "wise man scaleth the city of the mighty," and

"KNOWLEDGE BECOMES POWER."

SONG.

Hark! to a little song,
Telling of grievous wrong
Done to the nation.
You long I'll not detain,
But merely shall explain
What causes do sustain
Wrong to the nation.

Duty on malt and hops
Grinds down the farmers' chops,
And wrongs the nation.
All grain to this country
Admitted duty free
Is shameful roguery,
And wrongs the nation.

Poor-rate and county-tax
Hard is on farmers' backs,
And wrongs the nation.
But let us all unite
To gain the tenant-right,
And banish game laws quite:
'Twill right the nation.

POOR PRICE.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A MONTHLY COUNCIL was held at the Society's house in Hanover Square, on Wednesday, the 2nd of February. Present: The Right Hon. Lord Portman in the chair; Lord Southampton; Sir Matthew White Ridley, Bart.; Sir John V. B. Johnstone, Bart., M.P.; Mr. Raymond Barker; Mr. Barnett; Mr. S. Bennett; Mr. Brandreth; Mr. Burke; Col. Challoner; Mr. F. Cherry; Mr. Childers, M.P.; Mr. Druce; Mr. Brandreth Gibbs; Mr. Grantham; Mr. Hamond; Mr. Harvey; Mr. Fisher Hobbs; Mr. Hudson, of Castleacre; Mr. Jonas; Mr. Kinder; Mr. Milward; Prof. Sewell; Mr. Shaw; Mr. Shaw, jun.; Mr. Shelley; Mr. R. Smith; Mr. Stansfield, M.P.; Mr. T. Umbers; Prof. Way; and Mr. Henry Wilson.

Finances.—Mr. Raymond Barker, Chairman of the Finance Committee, presented to the Council the Report on the state of the Society's accounts at the last day of the month just ended, from which it appeared that the invested capital of the Society stood at £8,999 stock, with a current cash balance of £3,283 in the hands of the bankers. Mr. Barker explained that this floating balance was made up of £1,000 received as a subscription from York towards the country meeting of 1848, of £688 arrears of subscription paid up, of £371 received on account of Life-Compositions, and of £1,224 the remaining balance available for current purposes. He also laid before the Counsel, for the information of the Members, the quarterly statements of the several accounts of the Society classed under the different heads of receipt and expenditure.

York Meeting.—Mr. Raymond Barker having reported on the part of the General York Committee, held in London on the previous day, the reasons which had induced that Committee to recommend to the Council that the date of the ensuing Country Meeting of the Society to be held at the City of York in 1848, for a district comprising that county, should be fixed for the week commencing Monday the 10th of July next, the Council unanimously adopted that recommendation, and decided that the Tuesday, Wednesday, and Thursday of that week should be the days of exhibition, and Friday that of the General Meeting of Members, as usual.

Yorkshire Local Prizes.—Mr. Raymond Barker further reported, on the part of the General York Committee, the proposed distribution of the £350, remaining of the £450 placed at the disposal of the Council by the Yorkshire Agricultural Society, after the appropriation of £100 to two of the £50 prizes for Essays on the Farming of Yorkshire; when Sir John Johnstone favoured the Council with such detailed information connected with the local wants and wishes of the farmers of the county, in reference to these prizes, as were required by the Members present for the purpose of deciding on their respective subject and amount. The Council finally agreed to the following schedule of the local prizes in question, and decided that they should be competed for under the general regulations of the Society, by such parties only as are occupiers of a house or land in the county of York, on their making the proper entry with the Secretary of the Society, as required by those regulations, on or before the 1st of June: such parties being allowed to enter the animals shown for these local prizes for any of the general prizes also of the Society for which they are qualified to compete, provided a distinct separate entry is made to that effect:—

HORSES.

Best Stallion qualified to get Hunters	£30
Second best do. do.	15
Best Stallion qualified to get Carriage Horses	30
Second best do. do.	15
Best Stallion qualified to get Roadsters	20
Best Cleveland Stallion	20
Mare with her foal at foot, for hunting purposes	20
Second best do. do.	10
Mare with her foal at foot, for carriage purposes	20
Second best do. do.	10
Cleveland Mare with her foal at foot	20

SHORT-HORNED CATTLE.

Best Bull, of any age	20
Second best do.	10
Best Bull above one and not exceeding two years old	20
Second best do.	10
Best Cow above three years old	10
Best pair of Incalf-Heifers above two and not exceeding three years old	10

SHEEP.

Best Shearling Leicester Ram	15
Best Shearling Long-woolled Ram (not Leicester)	15
Best Pen of 5 Shearling Leicester Ewes	5
Best Pen of 5 Shearling Long-woolled Ewes (not Leicesters)	5

PIGS.

Best Boar of a large breed	5
Best Boar of a small breed	5
Best Sow of a large breed	5
Best Sow of a small breed	5
	£350

Trial of Implements.—Colonel Challoner, Chairman of the Trial of Implement Committee, obtained leave for that Committee to report to the Council at the next Monthly Meeting in March.

Steward of Implements.—On the motion of Mr. Brandreth, seconded by Mr. Shelley, Colonel Challoner was appointed one of the Stewards of the Implement

Department, in the room of Mr. Miles, M.P., who retires by rotation.

Paring Plough.—Mr. Miles, M.P., called the attention of the Council to a clerical error in the report of the implements at Northampton (*Jour.* viii., *p.* 344), in describing the paring plough exhibited by Mr. Kilby, of Queniborough, and to which the Society's prize was awarded—as "invented by Mr. Thomas Glover, of Thrussington, improved and manufactured by Thomas Johnson, of Leicester," instead of "invented by Mr. Thomas Glover, of Thrussington, improved by the inventor." The distinction, though apparently trifling, was, Mr. Miles had found from Mr. Kilby, an important and essential one.

Railway Liberality.—Mr. Fisher Hobbs reported to the Council that the Eastern Counties Railway Company had in the most handsome and liberal manner compensated him for the loss he sustained at the time of the Northampton Meeting, in having two bulls, two cows, and a calf, of the Hereford breed, accidentally destroyed by fire in being conveyed free of charge by that company to Northampton, for the purpose of exhibition. He had made his claim of 300 guineas as the value of those animals, and that sum had been paid over to him by the Eastern Counties Railway Company in the most liberal spirit. The Council expressed their gratification at receiving this report of the compensation to Mr. Fisher Hobbs for his loss and disappointment on the occasion of the Northampton Meeting, through the handsome conduct of the chairman and directors of the Eastern Counties Railway.

Farming Accounts.—Mr. Hobbs took that opportunity of presenting to the Society, on the part of the author, a copy of another published Farming Account Book; and as there were parties who were, without authority, announcing to the public by advertisement their respective account-books as "sanctioned" by the Society, he thought it desirable that the Farming Account Committee should be summoned to meet for business. The Council requested that Committee to meet during the current month, and report the result of their inquiries to the next Monthly Council in March.

Implement Judges.—Mr. Shelley had leave to postpone his motion on implement-judges to the next Monthly Council.

Notices of Motion.—On the 1st of March: Mr. Bennett to move the election of Mr. Hudson, M.P.; Mr. Fisher Hobbs, that of Mr. Jonas Webb; and Mr. Burke, that of Mr. Tweed—to fill the vacancy in the Council occasioned by the decease of Mr. W. R. Browne. Mr. Raymond Barker to move the appointment of Mr. Hudson, of Castleacre, as one of the stewards of the cattle yard, in the place of Mr. Pym, whose state of health still prevents his holding that important office.

The Council then adjourned.

A Weekly Council was held at the Society's house in Hanover Square on Wednesday, the 9th of February: present—Mr. Raymond Barker, in the Chair, Sir Matthew White Ridley, Bart., Mr. Bosanquet, Mr. Brandreth, Dr. Calvert, Mr. Cherry, Mr. R. W. Dixon, Mr. [illegible] H. D. [illegible], Mr. Fisher Hobbs, Mr. Majendie, Mr. C. Miles, Mr. Nesbit, Prof. Sewell, Mr. Slaney, M.P., Mr. Stansfield, M.P., Mr. Tweed, Mr. W. B. Webster, and Mr. Henry Wilson.

Communications were received from Mr. Cantelo, on Artificial Incubation; from M. Bérard, on the Cultivation of Waste Lands; from Mr. Taunton, on Cow-parsnip; from Mr. Lloyd, on Vineyards in England; from Mr. Deacon, on Russian Agriculture; and from Mr. Tweed, diagrams on Thick and Thin Sowing.—Mr. Cherry favoured the Council with a Paper and Illustrative Model on a Plough Tractor (by steam-power), of his invention; and Mr. Webster with specimens of his Sectional Tiles for Draining.—Mr. Slaney reported on the progress made by Mr. Parkes, in the Drainage of an Estate of Mr. Slaney's, in Shropshire; and Mr. Fisher Hobbs, on the Tiles manufactured by Mr. Dixon, in Essex.—Mr. Slaney gave the following notice of motion for the Monthly Council in March: "That the Council, or a Committee of their body, should have different subjects of general interest to Agriculturists, to be considered and discussed by the Members present, on each Wednesday during the sitting of Parliament, after the other business of the day is over, and that due notice be given beforehand to Members of Council and others interested."—The consideration of Mr. Johnson's offer to supply a proper quantity of his new manure for ten acres, for trial by Members of the Society, was postponed until the next Monthly Council.

The Council then adjourned.

A Weekly Council was held at the Society's house, in Hanover Square, on Wednesday, the 16th of February: present, Mr. Raymond Barker, in the chair; Mr. Almack; Mr. Bosanquet; Mr. Burke; Mr. Bramston, M.P.; Colonel Challoner; Mr. Fuller, M.P.; Mr. Fisher Hobbs; Mr. Wren Hoskyns; Mr. Hudson, of Castleacre; Rev. C. E. Keene; Mr. Kinder; Mr. Miles, M.P.; Mr. Majendie; Mr. C. Miles; Mr. Parkins; Professor Sewell; Mr. R. Smith; Professor Simonds; Mr. H. Tull; Mr. T. R. Tweed; Professor Way; and Mr. Webster.

Phosphate of Lime.—Professor Way, the Consulting Chemist to the Society, brought under the notice of the Council some discoveries lately made by Mr. Pain, of Farnham, in Surrey, which in Professor Way's opinion were likely to prove of great importance to practical agriculture. Mr. Paine had been induced to examine the subsoil of some parts of his estate, and had been fortunate enough to find large quantities of organic remains, consisting chiefly of phosphate of lime, the principal mineral ingredient, as it was well known, of bones. These remains were found in the land in two distinct geological formations; namely, in the upper and lower green sand, but more particularly in the latter. Professor Way stated that these beds would, he had no doubt, be economically worked, and that an abundant source of phosphate of lime would be obtained at a moderate price for all those agricultural purposes for

which the mineral constituents of bones had, by experience, been found to prove so beneficial.

Artificial Desiccation.—Mr. Webster called the attention of the Council to a new system of drying animal and vegetable substances by means of rapid currents of hot air passed through chambers in which such substances were enclosed, which he conceived would prove, in many instances, of great advantage in reference to agricultural produce. He exhibited specimens of various kinds of wood exposed in a green state to the influence of hot air in this process, and which, in one week, had become perfectly hard, dry, and solid, having lost a considerable amount of weight by the abstraction of moisture, and being left in a state only slightly susceptible of reabsorbing it. The articles to be dried were exposed to the currents of hot air (varying from 100 to 450 degrees Fahrenheit) in a brick chamber ten feet wide, fifteen feet deep, and twenty feet long, erected at an expense of from £150 to £200. Mr. Webster was engaged in experiments on the application of this process to agricultural purposes, and would report to the Council the result. In the mean time it had been advantageously applied to wood of all kinds, to tiles and bricks (and even to meat), to turnips, mangold-wurzel, carrots and parsnips; to mouldy hay (which it rendered perfectly dry and sweet), and mouldy or mildewed wheat; as well as to damp and tainted feathers and linen.

Australian Wheat.—Mr. Fuller, M.P., and Mr. Parkins reported similar success in their trials of the Australian wheat and barley forwarded to the Council and distributed among the members for cultivation; namely, that the wheat was a failure in their cases, but the barley most successful, yielding a large crop, and of a quality better suited for the maltster than any they had tried. Mr. Fuller also reported favourably of the Silesian beet he had tried, of his carrot crop, and his successful growth of the drum-headed cabbage. He attributed his exemption to disease prevailing in his neighbourhood, in the turnips, to his employment of sulphuric acid and bones. Mr. Robert Smith bore testimony to the peculiar value of that application; a crop of his in Rutlandshire having proved a most remarkable one from that treatment. An interesting discussion then ensued on the rotting of turnips, and on the best mode of cultivation to be abopted as a preventive of such results, in which Mr. Kinder, Colonel Challoner, Mr. Miles, M.P., and Mr. Raymond Barker communicated the plans which they recommended as the result of their own respective experience on the subject. Colonel Challoner related a striking instance that had come under his observation of the value of rooks in extracting grubs from the roots of turnips; every turnip on the field to which he alluded, where the beak of a rook had not been inserted, having been found to be cankered with the grub they had not extracted, in such cases as they had done from the other turnips of the crop, and which were found to be quite sound.

Miscellaneous Communications.—Mr. Chadwick's offer to attend and explain the construction and advantage of a draining level. Count Gripenberg's application in reference to his sowing-machine. Mr. Tu. ior's communication of a copy of a translation into Welsh, of the Cottage Tract on Gardening, published in the Society's Journal. Mr. Fison's suggestion on selection of grain for crops. Mr. Henry Wilson's communication from the Rev. Cop ger Hill, on the discordant statements of Von Thaër and Johnson on the equivalent of wheat corresponding to 100 of hay; and his suggestion for prizes on the subject, to induce further experiment. Lord Kenyon's transmission of a portion of a stratum of earth resting on marl, near Wrexham.

Among the numerous presents made to the Society, were the Transactions of the Agricultural Societies of Lyons, Vienna, and St. Petersburg.

The Council adjourned to Wednesday, the 23rd February.

NEW MEMBERS.

The Earl of Lonsdale, of Lowther Castle, Westmoreland, and Carlton-terrace, London, was elected a governor of the society.

Adam, Alexander, Mayor of Boulogne-sur-Mer
Ade, Charles, Westdean, Lewes, Sussex
Bacon, William, Chilton House, Darlington, Durham
Barker, Horace, Bury St. Edmund's, Suffolk
Bell, William Read, Gillingham. Shaftesbury, Dorset
Berners, Capt. Hugh, R.N., Gatcombe House, Newport, Isle of Wight
Blennerhasset, Rev. William, Tweme Vicarage, Blandford
Bolton, George, Shropham, Larlingford, Norfolk
Bower, Thomas Bowyer, Tweme House, Blandford, Dorset
Burnham, James, Winwick, West Haddon, Northamptonshire
Caulton, Thomas, Spalding, Linc.
Chase, Robert, Buckland Marsh, Faringdon, Berks
Churchward, Henry, Stonehouse, Brideslow, Okehampton, Devon
Church, John, Woodside, Hatfield, Herts
Croughton, William Peel, Heronden House, Tenterden, Kent
De Leuw, Dr., Grafrath, Elberfeld, Germany
Dickons, Thomas, High Oakham, Mansfield, Notts
Duffield, James, Great Baddow, Chelmsford, Essex
Ellis, John, Clement Lane, City of London
Farmer, Henry Grimes, Haven Farm, Tickhill, Yorkshire
Foulkes, James Hassall, Chester
Fowler, William Barratt, Freazley, Fazeley, Staffordshire
Fussel, Rev. G. C. Chantry, Frome, Somerset.
Gurdon, Barrett, Assington Hall, Boxford, Suffolk
Haggitt, Henry, Bury St. Edmund's, Suffolk
Hamilton, Edward, Bridgnorth, Salop
Hertefeld, Baron, Liebenberg, Berlin, Prussia
Howell, William Parker, Britannia Square, Worcester
Hutchinson, The Hon. Colonel Henry Hely, Weston House, Toucester, Northampton
Hyde, Francis Colvil'e, Syndale, Feversham, Kent
Ingram, George, 198, Strand, London
Isham, Sir C. E., Bart., Lamport Hall, Northampton
James, Edward, Wylam Hall, Newcastle-upon-Tyne
Jeffkins, George, Crosby-square, City of London
Johnson, Robert, Westborough, Long Bennington, Newark, Notts
Lacey, William Charles, Sutton, Carshalton, Surrey
Luxton, Robert George, Brushford, Crediton, Devon
MacDuff, Capt., Blair Castle, Blair Atholl, Perthshire

MacLagan, Peter, Invercauld, Braemar, Aberdeenshire
Marshall, Joseph, Ashgrove, Halifax, Yorkshire
Matchett, William, Norwich
Meadows, Rev. John Brewster, Witnesham, Ipswich, Suffolk
Nelson, John, Highfield, Sheffield, Yorkshire
Otranto, Count Athenase, Nuzgard, Söderköping, Sweden
Overman, Robert, Burnham Market, Norfolk
Pollard, Pascho, jun., Berrys, Totness, Devon
Robinson, Richard, Belfast
Rosewarn, John, Nanpuska, Gwinnear, Hale, Cornwall
Scragg, Thomas, Calveley, Tarporley, Cheshire
Sidgreaves, James, Fishergate, Preston, Lanc.
Skipworth, Henry Green, Rothwell House, Caistor, Linc.
Sleight, Thomas, Rhyd, St. Asaph's, Flintshire
Small, Patrick, Dirnaneaw, Blairgawrie, Perthshire
Tanqueray, John, Hendon, Middlesex
Thomas, David, Brecon
Trotter, George Dale, Bishop Middleham, Darlington, Durham
Waterhouse, Edward, Liverpool
Wheble, J. J., Bulmarsh Court, Reading, Berks
Wills, John, South Petwin, Launceston, Cornwall
Wigney, Thomas Jennings, Huddersfield, Yorkshire.

THE TOTAL REPEAL MALT TAX ASSOCIATION.

When the Total Repeal Malt Tax Association was first formed, we strongly urged upon its members the necessity for organizing such a system of machinery throughout the country as would enable them to give a powerful expression of the feelings of all those who sought the repeal of that tax at the proper moment, being well persuaded that no relief would be obtained but through a strong pressure from without. Great exertions have been made by the committee, and a determination of purpose has been displayed, which if continued must eventually be successful. For this, the parties interested in the repeal of the malt duty are very greatly indebted to Mr. Jeremiah Smith, of Rye, a most active and zealous member of the committee, but for whose perseverance the Association would, we believe, have long since sunk under the seeming hopelessness of its prosperity. We give elsewhere a brief report of the proceedings at an interview of a deputation of the Association with Lord John Russell and the Chancellor of the Exchequer, on Wednesday, Feb. 16; upon which occasion the claims of the agriculturists to a repeal of this obnoxious tax were ably laid before the Premier and his colleague by Mr. Lattimore and other members of the deputation. We doubt not but that very many persons will indulge in a sarcastic smile at the weakness of men who could entertain the expectation that such a proposition would be listened to at a time when there was a large deficiency subsisting in the revenue, and on the very eve of the period when the Minister was about to announce that which all expected, and which he has since done—an increase of taxation. If we thought that the members of the deputation indulged in a hope so visionary as that of a repeal of the malt duty in the present session of parliament, we should join in a smile at their credulity; but we believe that these gentlemen entertained no such expectation. We believe that the object contemplated was not only to maintain the claim of the farmers to relief from this mischievous tax, by calling the especial attention of the Government to it when the taxation of the country was under consideration; but also to prevent that charge being made against the farmers, as a body, which Ministers are so ready to avail themselves of when it suits their purpose, that from their not taking steps to make their wishes known, they were thought to be indifferent to the subject. We feel persuaded that the period has arrived when the Association should take measures for establishing small committees in every market-town in the kingdom, to be ready for action when the fitting time comes. All are acquainted with the parable of the *foolish* virgins. It will doubtless be asked why we think the time has come when serious preparations should be made: we will state our reasons. Hitherto a large class of persons have been apprehensive that the repeal of the malt tax must be accompanied by an increased property tax, and, upon a balance of the account, knowing that their share of the latter tax would be much heavier than it is of the former, have not only been indisposed to advocate the repeal of the malt tax, but have used their influence to suppress any agitation of the question. Unforseen circumstances have so deranged the finances of the country, that an increase in the property tax has been found necessary; and notwithstanding the general sullenness of the House of Commons, and the expressed opposition of individual members upon the proposal of the scheme by Lord John Russell, it will be carried. The Premier

"Proposed that they should continue the income-tax, which would expire in April next, for five years, and increase its amount from 7d. to 1s. in the pound, or from 3 to 5 per cent., for the next two years."

This announcement of the period of two years was received by the House of Commons with ironical cheers, indicative of a belief that as the temporary imposition of the 3 per cent. had been continued, so would the 5 per cent.; and

of this opinion is the Chancellor of the Exchequer, the honourable gentleman having

"Declared his belief, that when the Income Tax was voted no man really believed that there was any prospect of its being taken off; and as to the addition of two per cent., now proposed for two years only, he would not make any promise, as he did not wish to be taunted with it hereafter."

We wholly concur in these remarks. We gave it as our opinion, when the Property Tax was imposed, that it would not be taken off, and we express our conviction now that the addition once made will not be removed. Lord John Russell said:

"The result of his scheme would be this: the expenditure being £54,596,500, and the income £51,250,000, he proposed to make up the deficiency by the increase of the Income Tax, which he estimated to produce £3,500,000, making a total income of £54,750,000. He also proposed to remit the highly injurious duties on copper ore, which were imposed in 1842, and produced £41,000. When those duties were remitted, he should have a surplus of income over expenditure amounting to £113,000. In another year he trusted that the surplus would be largely increased, by the cessation of the expense occasioned by the Caffre war; and it might then be applied to the reduction of those taxes which press most heavily on the elastic springs of industry. It was not in his power at present to propose any such reduction."

He proposes to apply any surplus that may arise "to the reduction of those taxes which press most heavily on the elastic springs of industry." In plain speaking, the Property Tax of 5 per cent. will be renewed from time to time—that is, continued; and if the revenue resumes its elasticity, the surplus will be applied to the reduction of other taxes or duties. We have little doubt but that in the very next year there will be an available surplus of sufficient magnitude to be worthy of notice, and then the scramble will begin. Tea, sugar, soap, windows—each and all will have their respective advocates. Those who squeeze hardest will obtain the most. If the advocates for the repeal of the malt-tax are not ready, they will be in the situation of the *foolish* virgins: whilst they are trimming their lamps, "the door will be shut." The Premier calculates that the increase of 2 per cent. on the property-tax will produce £3,500,000—a sum which will, we have little doubt, within three years be at his disposal. The important question then is, in respect to the repeal of the malt-tax. Are the farmers prepared to allow the minister of the day to deal with them just as he pleases? if so, it were better to signify their submission, and set the question at rest; if not, then we say now is the time to begin your preparations for the contest. We are glad to see that Mr. Hudson and Mr. Hobbs urged upon the Government another experiment upon feeding cattle with malt, under the superintendence of practical farmers. It is impossible for anything to have been more unsatisfactory than the previous trial made by order of the Government. It is of importance to the country at large that the question of the value of malt in feeding cattle should be set at rest, both in an economical and financial point of view. The cost, as compared with some other speculative matters, would be a mere bagatelle. In the mean time, however, if the advocates for the repeal of the malt-tax do not organize such a force as shall produce an impression upon the minister, be he whom he may, tea, sugar, soap, and windows will divide the surplus revenue when it arises.

A deputation from this society had an interview with Lord John Russell and the Chancellor of the Exchequer, in Downing-street, on Wednesday, Feb. 16. It comprised—Sir E. Filmer, Bart., M.P.; C. H. Frewen, Esq., M.P.; A. E. Fuller, Esq., M.P.; T. L. Hodges, Esq., M.P.; H. M. Curteis, Esq., M.P.; B. Bond Cabbell, Esq., M. P.; W. Deedes, Esq., M.P.; Major Curteis; the Rev. T. O. Goodchild, and the following eminent agriculturists and others from their different counties: Messrs. J. Hudson, S. Lock, J. Cobon, and L. Sorby, from Norfolk; Jer. Smith, W. P. Lamb, H. Selmes, S. Pix, H. Smith, H. T. Smith, Tilden Smith, Tilden Smith (of Vine Hall), J. Hilder, G. P. Bacon, J. Mortimer, and W. E. Baxter, from Sussex; E. Strouts, J. Kemp, F. K. Elvy, James Hilder, R. Matson, C. Neame, and T. B. Shoobridge, from Kent; W. Fisher Hobbs and W. Hutley, from Essex; G. Clarke and C. H. Lattimore, from Hertfordshire; G. Smith, W. P. Paunton, and G. W. Johnson, from Hampshire; C. Pocock, from Berkshire; R. Beman, from Gloucestershire; E. Davers, from Devon; Mr. Corbet, the Secretary to the association, &c., &c.

Mr. Lattimore having been requested to explain the object of and the grounds on which the deputation urged its consideration, was introduced by Mr. Frewen, and commenced by assuring the noble lord that the deputation was not influenced by any feelings of hostility or desire to importune, or unfairly press upon the ministers; and he would say, on his own behalf, had their views been otherwise, he would not have taken any part in it. They were fully aware of the deficiency in the revenue, caused by an unparalleled combination of unfavourable circumstances, which precluded all hope of any immediate relief; while on the other hand, feeling deeply the great national evils entailed by the operation of the Malt Tax, they were desirous to make an impression of those evils on the mind of the noble lord, which they would fain hope might tend to promote an abolition of this most injurious impost at the first favourable

opportunity. He would now proceed to point out some of the objections to which, as an agriculturlist, he considered it liable. In the report of the committee of the House of Commons, 1828, on the public income and expenditure—"It is laid down as unjustifiable to take from the people any tax that can be obtained at a smaller sacrifice." Taking his stand upon this principle, he believed the "Malt Tax" to be untenable. In the first place let them observe its effect upon consumption. It was obvious that a tax of 75 per cent. upon any article must considerably enhance its price, and consequently lessen its consumption. This had been fully exemplified in the operation of this tax. It appeared in the

Year.	Population.	Bushels of malt made.	Duty per bushel. s.	d.	Consump. per head. bush.	gal.
1730 ..	5,687,993 ..	28,410,421 ..	0	6 ..	5	0
1821 ..	11,978,875 ..	26,138,137 ..	3	7¼ ..	2	1½
1829 ..	13,431,027 ..	23,428,135 ..	2	7 ..	1	6
1831 ..	13,897,187 ..	32,963,470 ..	2	7 ..	2	2¾
1845 ..	16,711,725 ..	30,508,840 5 per cent. added			1	6¾

These calculations referred to England and Wales alone, and clearly pointed out the effects of an increase or reduction of the duty, as the repeal of the beer duty in 1829 gave an impetus to consumption of about 30 per cent., while 5 per cent. added to the Malt Tax in 1840, produced a proportionate decrease. In the second place, he contended that a disarrangement of the cultivation of the soil was thereby occasioned, and large breadths of land displaced from the production of barley. In proof of this, he pointed out the *small proportion* of the arable lands annually sown with barley. He would take the estimates of Mr. M'Culloch, which, though not perhaps critically correct, he believed to be pretty near the truth :—

	Acres.		Acres.
England and Wales, arable.....	11,749,000	sown with barley and rye	900,000
Scotland, ditto	2,543,450	ditto barley....	280,000
Total	14,292,450		1,180,000

This showed that little more than 1-13th part of the arable lands of the kingdom was annually cultivated with barley, and when they considered the great increase of that grain produced in Norfolk, and also upon the light soils of the kingdom during the last thirty years, the inference was clear (from the consumption of malt not having proportionably increased) that large portions of the stiffer soils, capable of growing abundant crops of barley of coarse quality, had, in consequence of the tax, ceased to grow barley at all, and a check was thereby given to the progress of agriculture. And thirdly, the duty acting as a prohibition against malting the inferior qualities of barley for the use of cattle, the price of linseed cakes, and other artificial food for stock and cattle, was thereby unduly enhanced. He contended, that in consequence of the small number of large brewing firms, by their combination, the trade in malt became a close monopoly: none but the best qualities of malt were saleable in the London market, consequently the inferior kinds of barley were a mere drug—and to shew that the tendency of the present system was to depress the value of barley, while it enhanced the value of linseed cakes, he gave the following statement of the prices during the last three years :—

PRICE OF BARLEY.	Per qr.	PRICE OF LINSEED CAKES AT THE MILL.	Per ton.
On 1st Oct. 1845, about	35s.	On 1st Oct. 1845	£10 0 0
1st Jan. 1846.....	34s.	1st Jan. 1846	10 15 0
1st Oct. „	44s.	1st Oct. „	10 15 0
1st Jan. 1847.....	60s.	1st Jan. 1847	11 7 6
1st Oct. „	31s.	1st Oct. „	11 2 6
1st Jan. 1848.....	30s.	1st Jan. 1848	11 10 0

Thus it appears that while the price of barley on the 1st of January, 1848, had fallen 100 per cent, the price of linseed cakes had actually advanced 7s. 6d. per ton; and further, that while inferior barley, weighing 50lb. per bushel, had been sold at 25s. per quarter, oats, weighing only 40lb. per bushel, had been held at equal value, shewing a depreciation of 20 per cent. between those two articles, although estimated by scientific men in the inverse proportion of barley at 32 and oats at 24, or at a difference of one-third for feeding purposes. He then alluded to the importance of manures, as forming a consideration of great value in this question. While we were importing guano, nitre, nitrate of soda, and various kinds of manure at a great cost, the return and profit of which were always extremely problematical, we were abandoning a certain and unfailing means of enriching our soil from our own resources; and this brought him to the vast national advantages derivable from stock-farming. He (Mr. Lattimore) had always contended that a judicious system of stock-farming was the only basis upon which the agriculture of this kingdom could be permanently carried on with prosperity and advantage, and that whatever tended to reduce the quantity of stock in this country was a public calamity. It was notorious, as to the existing deficiency of sheep and cattle, compared to what the country could profitably maintain; one great cause of which was doubtless attributable to the high price of artificial food, which he believed would be lowered by the abolition of the Malt Tax. Several trials had taken place in feeding cattle with malt, by eminent graziers, with invariable success, amongst whom he might mention Messrs. Hudson and Overman, of Norfolk; Mr. Selmes, of Sussex; and Mr. Cock, of Kent; and whenever a trial had been judiciously made, he believed it had always proved to be extremely beneficial. It was true an experiment had been made by two learned gentlemen —Drs. Playfair and Thomson, under the auspices of the government, in 1843, which was not so favourable; but, when he read the modes of treatment of the animals, described in the report, he was not greatly surprised at the result. Now, Dr. Thomson published a work in 1839, upon vegetable chemistry, in which he gives the following estimation of the real loss in the weight of barley, in the process of malting, at 8 per cent., in the following manner :—

Carried off by the steep-water	1	5
Dissipated on the floor	3	0
Roots, separated by clearing	3	0
Waste.....	0	5
	8	0

He estimates the weight of the roots at 4 per cent., and

the subjoined analysis of barley, and the malt made from it:—

	Barley.		Pale Malt.		Difference.	
Gluten	3	..	1	..	Loss	2
Sugar.....	4	..	16	..	Gain	12
Gum	5	..	14	..	Ditto	9
Starch	88	..	69	..	Loss	19
	100		100			

Thus it appeared that a loss of eight per cent. in weight was sustained, and a change of qualities in the malting, whereby a loss of two parts of gluten and nineteen of starch was replaced by a gain of twelve parts sugar and nine parts of gum. Now, he would take the definition here given by Dr. Thomson as to quality, but he would greatly prefer the judgment of the experienced graziers above named as to the *mode of using* the article, and he was sceptical as to any deterioration of the feeding properties of malt by the substitution of twenty-one parts of *gum and sugar* for twenty-one parts of *gluten and starch*. He took it, that *gum and sugar* were far more nutritious than *gluten and starch;* and looking at malt, both as a stimulus and a tonic, it naturally required great skill and care to use it rightly. He entreated the noble lord to allow a fair trial of malt against barley, to be made under the auspices of practical graziers (if he entertained any doubt upon the subject), and he would satisfactorily abide the issue. Another point to which he directed the attention of the noble lord was, the superiority of England to the world, in the manufacture of malt and malt liquors. If all the restrictions upon its manufacture were removed, he believed that our export of malt liquors might be increased *ad infinitum*. A gentleman who recently returned from Prussia, informed him that a bottle of Scotch ale was worth 2s. 6d. there, and when they considered that as equivalent to two pecks of wheat sufficient to maintain a labourer's family of *five* persons for *several days*, the folly of preventing the export of a manufacture purely the growth and produce of our own country would become manifest. And he (Mr. Lattimore) believed that it was equally desirable to exchange a species of manufacture, the produce of our own country, for the productions of other parts of the globe, as any other kind of manufacture the raw material of which might have been procured from a foreign soil. As he had always advocated a free and unfettered exchange of our own productions for the produce of other countries, in accordance with the convenience and social comforts of mankind, he contended for this right as a measure of justice to the agriculturists. He had thus endeavoured to show that the malt tax diminished the consumption of malt; disarranged the best modes of cultivation; enhanced the price of artificial food for stock and cattle, whereby the fertility of the soil was deteriorated, the demand for labour lessened, and the supply of bread corn and animal food considerably decreased; the comforts of the people and the wealth of the country were also greatly impaired: and he believed that, in accordance with the excellent principle laid down in the report of the finance committee in 1828, this tax was wholly indefensible, and ought to be abolished. Mr. Lattimore then alluded to the discussions which had taken place upon this subject, and the marked want of sincerity thereon. It had been repeatedly discussed previous to Sir W. Ingleby's motion in 1834, when a majority of the House of Commons actually abolished the Malt Tax, but when on the following evening that truly honourable man, the late lamented Earl Spencer, the Chancellor of the Exchequer, agreed to its abolition upon condition of a Property Tax to supply the deficiency, the courage of these agricultural champions failed, and they rescinded their previous resolution by a counter vote. Then came the motion of the late Mr. Cobbett in 1835, who proved the oppressiveness of the Malt Tax upon the mechanics and working men in towns, which was supported by a very small minority. We pass on to the loud and angry declamations upon this subject from 1841 to 1844, during the corn law discussions, when its repeal was demanded despite the abolition of the corn laws, and prognosticated as impossible to be maintained a single day after such repeal. And considering that we have now a property tax, a total repeal of the corn laws, liberty to use sugar in breweries, and a desertion of the professional "farmers' friends," who have now turned their backs upon the tenant farmers, leaving them to seek justice wherever they can find it, he now appealed to the farmers of the country, whether the past treachery and desertion they have experienced upon this subject will not enable them to decide henceforth between real and professing friends. But if that class of landowners thought they might safely disregard the welfare and prosperity of their tenantry, and that their rents still to be secure, he would remind them of the probable effects of the first *wet harvest*, that might occur in this country; with a continuance of the malt tax, the farmers might find themselves hampered with five million quarters of black and damaged barley, for which they could find no market abroad, and against the use of which at home the tax on malt became an effectual barrier. Then they will find that rents will not be paid, and a storm of indignation will greet them, which they will have richly deserved. If they knew their own interest, any additional tax upon real property would be amply repaid by the stimulus given to industry and the cultivation of the soil, which the abolition of the malt tax could hardly fail to impart. Mr. Lattimore then regretted that the Rev. Dr. Lamb was unfortunately prevented through illness from being present, and stating his opinions as to the injury inflicted upon the physical comforts and the moral welfare of the labouring classes by the operation of this tax. He could bear testimony to the truth of the views entertained by the reverend gentleman, for he invariably found that the better class of labourers were those who enjoyed their beer by their own firesides, whilst the most dissolute consisted of those who were destitute of all social and domestic comforts; and he further contended that it was cruel and unjust to deprive the toiling labourer of those means of support destined by Heaven to aid and ameliorate his toil; whereas, by raising the standard of his social welfare, we were providing the best and cheapest armament of defence for

our country. In conclusion, Mr. Lattimore thanked the noble lord for the kind attention with which he had listened to his observations. He believed there were but two points upon which the government could give any assistance to the farmers—namely, "Freedom to their industry" and "Security for their capital." Upon these two grounds he entreated the aid of the noble lord and his colleagues, well assured the rest must always depend upon their own skill and industry, influenced by the prosperity of the community at large, which he believed would be greatly promoted by the total repeal of the malt tax.

Mr. Lattimore was followed at some length by Mr. Loch, of Barton-Bendish; Mr. Hudson, of Castleacre; Mr. W. Fisher Hobbs; and Mr. W. P. Lamb; all of whom spoke with very great effect. Mr. Hudson, in particular, confirmed from his own experience the utter fallacy of the experiments published by Drs. Playfair and Thomson as to the advantage of feeding on malt, and suggested that the government should select twelve practical farmers to re-try the question. In this Mr. Hudson was supported in every way by Mr. Fisher Hobbs, who spoke as to the value of malt, not only for feeding the ox, but also the sheep and horse; and instanced the case of one of the Duke of Bedford's tenants, Mr. Thomas, who had used it for those purposes with the greatest success. Mr. Hobbs also alluded to the immoral and pernicious consequences arising from forcing the farm-labourer to the beer-shops, instead of encouraging him to brew the little he required at home.

The different statements were received with great attention by the Premier and the Chancellor of the Exchequer, the former of whom, though he gave the deputation no hope of immediate relief, certainly responded in a tone that must have encouraged every one present to continue and increase the agitation of the question.

BOUSSINGAULT'S "RURAL ECONOMY" (1st Ed.): REVIEW OF HIS FALLACIES; AND REMARKS ON MANURES.

BY CHARLES B. BOAST, M.R.C.S.L.

I am led to trouble you with the following, in consequence of the last number of your magazine containing a short article comparing the views of Liebig as to the value of inorganic manure, with the opinions of Boussingault, which are altogether in favour of inorganic. The organic theory is the older and more agreeable to the prejudices of farmers, who, as a body, are certainly never very ready to adopt anything new, either in theory or practice; however, truth and the inorganic theory must ultimately prevail; in the mean time, the following extracts from Boussingault's work, coupled with the observations I have subjoined, will show that all he advances is certainly not to be believed, and that the book is full of contradictions and fallacies.

BOUSSINGAULT.

"Whatever may be its constitution and physical properties, land yields lucrative crops only in proportion as it contains an adequate quantity of organic matter in a more or less advanced state of decomposition. There are favoured soils in which this matter, designated by the name of humus or mould, exists by nature; while there are others, and they form the majority, which are either totally destitute of it, or contain it but in insignificant proportion. To become productive, these soils require the intervention of manure; for this there is no substitute, neither the labour which breaks them up, nor the climate which so powerfully promotes their fecundity, nor the salts and alkalies which are such useful auxiliaries of vegetation" (p. 309).

REMARKS.

So, the salts and alkalies, the inorganic substances on which manure really depends for its value, are *merely useful auxiliaries*, and it is the organic matter of manure which is most essential; yet farmers say that dung well rotted, and therefore poorer in organic matter and richer in the salts and alkalies, compared with fresh, acts more quickly and produces more marked effects; still is land pared and burned to the complete destruction of organic matter, and the supply thereby of salts and alkalies alone; still do we hear of the burning of clay, thus making, in order to use it as manure, more free its salts and alkalies; still do farmers burn sea-weed and weeds of all kinds, using their ashes, as well as those of wood, with great benefit as manure; still is the use of lime persisted in, though it must destroy the organic matter of soils, and tend only to their more rapid disintegration, and the freeing of their salts and alkalies; and still do farmers fallow their land, giving it repeated ploughings, to expose it to the action of the atmosphere, and favour its disintegration, heedless of the destruction caused thereby of its organic matter.

"It is not organic matter, but the amount of azotised organic matter, upon which '*almost alone*' depends the value of the manure" (p. 363).

Lime, ashes, fallowing, paring and burning, salt, gypsum, superphosphate of lime, &c., cannot act by the supply of azotised organic matter, nor can to such be ascribed the increased value of rotten dung.

"Like other mineral manures, lime of itself produces little or no effect: it is in concurrence with organic manures that it becomes truly useful; it is

nowise and never can become a substitute for these" (p. 401).

Lime *does act without* the concurrence of organic manures, and has been used alone, without the supply of any organic manures, on some lands almost for centuries; and it acts clearly by unlocking and exhausting the mineral treasures of the soil—the salts and alkalies.

"Wood ashes contribute to improve the soil. Although the utility of wood-ashes is generally admitted, their high price enables the husbandman to employ them but rarely" (p. 410).

Wood ashes do not supply azotised organic matter, and they are too a mineral manure. Now compare this extract with that of pp. 401 and 363; for he says here, they contribute to improve the land; and moreover, it is well known that without any supply of azote, or the concurrence of organic manure, they do effect wonders.

"The good effects of wood-ashes on vegetation is known to communities the least advanced in civilization. The Indians of South America burn the stems and leaves of the maize, in order *to improve* the soil. The same practice occurs among the natives of Africa; according to Tuckey the ground is prepared by having little piles of dried herbs placed on it, to which fire is set; and upon the spots where the ashes are collected, they sow peas and Indian corn; these ashes are in fact the *only* manure used" (*ibid.*)

The Indians, then, do not turn the leaves into the ground for the sake of their organic matter, but burn both leaves and stems; and what is really more extraordinary with the natives of Africa, ashes are the *only* manure used. M. Boussingault must have concluded the soil was *naturally very* rich in vegetable mould, otherwise he would have drawn conclusions unfavourable to his organic theory.

Speaking of inorganic substances, he says—"Such is their ascertained influence indeed, that tobacco, barley, and buck-wheat sown in soils absolutely without organic matter, but containing saline substances, and only moistened with distilled water, produced perfect plants, which flowered, and fruited, and yielded ripe seeds; whence it follows, that the presence of saline matter favours remarkably the assimilation of the azote of the atmosphere during the act of vegetation" (p. 490).

"Whence it follows, that the presence of saline matter favours remarkably," &c.: here is a halting conclusion! Surely, unless prejudiced and blinded by a pre-formed opinion, the inference to be drawn is, that the presence of saline matters is all-sufficient, indispensable, and most important.

"The lately cleared lands of America abound in humus, and the plants indigenous there were most beneficially acted on by gypsum. Experience soon set bounds to its indiscriminate laudation; it was found that gypsum alone was inadequate to produce fertility—that it required the concurrence of organic manures, if the soil did not contain them" (p. 421).

These lands are rich in alkalies &c., which have been collecting in them for centuries, and in clearing, by the burning, they would be still further enriched, but the gypsum only could do good as long as the supply of the inorganic ingredients, the alkalies, phosphates, &c., continued; you cannot by culture exhaust a soil of humus. Liebig says, the first colonists of Virginia obtained harvests of wheat and tobacco for a century, from one and the same field, without the aid of manure; but now whole districts are converted into unfruitful pasture land. From every acre of this land 12,000 lbs. of alkalies were removed in 100 years, and it became unfruitful because it was deprived of every particle of alkali fit for assimilation. It is the greatest possible mistake to suppose that the temporary diminution of fertility in a soil is owing to the loss of humus; it is the mere consequence of the exhaustion of alkalies and other essential ingredients.

"GROWTH OF SAINFOIN UPON SOILS DRESSED WITH GYPSUM.

		Per Acre in Seeds.	Depth of Soils.
1st experiment	produced	5 0 22	3 feet.
2nd "	"	3 1 15	18 inches.
3rd "	"	1 3 15	3 inches.

The soils of little depth wanted some principle essential to fructification, which gypsum, in spite of the assistance it gives, is yet incompetent to supply. This principle is in all probability organic matter, which is naturally more abundant in the layer of true vegetable mould which is deepest" (p. 425).

The true cause (as every thinking and unprejudiced person must admit) of the small produce here in the soil three inches deep, is, that there was not sufficient alkali &c. present, in so small a quantity of soil, in a condition to supply the wants of the crop. The soil in which these experiments were made was light, with a substratum of chalk; and here let me add that clay soils are comparatively more fertile than sand or chalk, not because clays are richer in organic matter or vegetable mould, but in alkalies &c., the mineral ingredients of crops.

"Bones must be regarded as a manure, the action of which is of long duration, because the animal matter contained in them decomposes slowly, protected as it is by the earthy casing which surrounds it" (p. 366).

Now if bones acted from their organic matter, their effects would be more uniform. The truth is, they act from their earthy phosphates; and where these are deficient in soils they do good: where the phosphates are present in abundance, of course they produce little or no effect.

"There are certain plants, which cannot be re-

produced upon the same soil advantageously, except at intervals more or less remote. The cause of this exigence, on the part of certain vegetables, is still obscure, and the hypotheses propounded for clearing it up far from satisfactory" (p. 459).

If M. Boussingault would but admit the immense importance of the inorganic elements of crops, there need be no obscurity. Wheat requires largely silicates of the alkalies; clover, lime; and turnips, potash. And we know that some soils, naturally rich in these respective ingredients, will produce these crops in closer succession than others. Liebig says that in Virginia, by the crops of wheat and tobacco grown on one and the same field for a century without manure, 12,000 lbs. of alkali were removed, and the land became unfruitful because deprived of all alkali fit for assimilation.

"The finest crops of Indian corn in America are obtained upon breaks of virgin soil. The planter chooses the end of the rainy season for cutting down the trees and brushwood; every thing remains where it falls, till dry; fire is then set to the heap, and the burning extends and lasts even for weeks; all the smaller branches are completely consumed, and nothing but the charred trunks of the larger trees remain. As the rainy season is about to return, a man with a pointed stick goes over the burnt surface, making a hole of no great depth at intervals, into which he throws two or three particles of Indian corn, over which he draws a little earth or rather ashes; it is unnecessary to hoe: the burning having destroyed all the plants that were indigenous to the soil, nothing rises but the grain sown. In such fields, stems of Indian corn are frequently seen of the height of from 12 feet to 14 feet. It rarely happens that more than three consecutive crops are taken from the burnt soil; and the last, though still very superior to anything we can obtain by our regular husbandry, is not to compare with the first" (p. 231).

Here all is *completely* consumed but the trunks of the larger trees, the seed covered with ashes rather than earth, and the result three extraordinary *consecutive* crops—the last even not such as can be obtained, Boussingault says, by our regular husbandry; but he will not explain why, though it is clearly because such quantities of ashes yielding so large a supply of mineral matters are not applied. The ashes can supply neither azote nor humus, but the latter is present in sufficient quantity in all cultivated soils, and the azote is always present in the form of ammonia, not only in the atmosphere, but also in all soils. Liebig has ascertained that in average clay soils there will be found in one acre, nine inches deep, about 8,000 pounds of ammonia, and that the poorest sandy soils contain, in the same extent and depth, about 4,000 pounds.

"Upon the sandy downs of the coast of the Southern Ocean, a brilliant vegetation is seen along the course of the few rivers which traverse them; all beyond is dust and sterility. I have seen rich crops of maize gathered upon the plateau of the Andes of Quito, in a sand that was nearly moving, but which was abundantly and dexterously irrigated" (p. 300).

In these almost moving sands there could not have been organic matter to produce rich crops of maize: the water here supplied the mineral ingredients; the effect of the supply of which by ashes we have just seen in the preceding extract from page 231.

"The burning steppes of Africa and America have their oases here and there, the surface of which, moistened by a spring, is green with vegetation" (p. 305).

Here again, in soils destitute of organic matter, we have water, by the traces of alkalies &c. it would hold in solution, causing vegetation.

"Turf or turfy soils yield rich crops when we succeed in converting the turf into humus.... Turfy lands can also be brought into an arable state with the help of paring and burning" (p. 304).

Burning cannot convert turf into humus, but must destroy its organic matter, and tend to set free its salts and alkalies.

"It is well known, that bogs consisting of pure turf, when drained and limed, become tolerably fertile lands, yielding magnificent crops, of oats and turnips especially" (p. 413).

Draining admits air, which, with the lime, destroys the organic matter of the turf, making soluble its inorganic ingredients for the use of the crops.

"Dr. John Davy, who visited the nitre districts of Ceylon, and Proust, who long inhabited the Peninsula, have given it as their opinion that the nitre appears in soils which contain no vestiges of organic matter. The assertion of Proust, however, is open to suspicion, inasmuch as he affirms that the lands close to those that produce the nitre are extremely fertile, so that they yield abundant crops without ever receiving manure. But *at the present* day, *it is a law* that *every fertile* soil *must contain* or *receive dead organic matter*" (p. 327).

Here is the opinion of two scientific men set at nought by Boussingault's *assumption* that *every fertile* soil *must contain* or *receive dead organic matter*; however, *the fact* remains that these soils *do produce* abundant crops *without ever receiving manure*—without, therefore, any supply of azote or organic matter; of which latter, in the opinion of two eye witnesses, they are nevertheless wholly destitute, the chief cause of their fertility being doubtless the abundance of alkali contained in them.

"Although a soil which is entirely without humus may be cultivated, by calling in the aid of manure.

and as humus consequently need not be regarded as indispensable, still this matter generally enters in certain proportions into the constitution of soils. The soils of forest lands contain a large quantity of it, and some soils are mentioned which are very rich in it, and which yield abundant crops of grain for centuries, and with very little attention" (pp. 266 and 267).

So you cannot cultivate land destitute of humus without supplying it in manure; lime then ought to act injuriously by destroying humus; how are we to explain its acting beneficially? also, how account for the effects of ashes, fallowing, paring and burning, &c.? Again, forest land, it is true, is rich in humus, but it was never supplied to the trees by manure, and yet the longer they stand the richer the soil becomes in it. Liebig says (p. 116) the land in the vicinity of Vesuvius may be considered as the type of a fertile soil; and this soil being derived from the disintegration of lava, cannot possibly, from its origin, contain the smallest traces of vegetable matter; yet every one knows that when lava or volcanic ashes have been exposed for a time to air and moisture, all plants grow in them with luxuriance, owing to the alkalies, alkaline earths, and silica contained in lava, being by exposure to the weather rendered soluble.

"In examining a soil, attention ought to be directed first, to the sand; secondly, to the clay; thirdly, to the humus which it contains. It would be further useful to enquire particularly, in regard to certain other principles which exert an unquestionable influence upon vegetation, such as certain alkaline and earthy salts" (p. 267).

In examining a soil, attention would be best directed to its depth, its mechanical properties, subsoil and drainage; the humus if necessary, as well as the certain other principles, can both be supplied in manure; and the certain alkaline and earthy salts will truly exert an unquestionable influence, though the effect of humus would be very questionable.

"Cactuses and fleshy plants take root in sands; mimosa, the broom, furze, &c., show themselves upon gravels. These plants grow, and after their death, in part or wholly, leave a debris, which becomes profitable to succeeding generations of vegetables. Organic matter accumulates in the course of ages in the most ungrateful soils, and by these repeated additions they become less and less sterile" (pp. 262 and 263.)

Here we see vegetation *adding* organic matter to the soil, the accumulation of it, according to M. Boussingault, making land fertile; yet peat and turf lands, so rich in organic matter, can be, he says, (*vide est* p. 304) "brought into an arable state by paring and burning," and by (*vide est* p. 413) lime; that is by destroying the (according to Boussingault) fertilizing principle. Liebig mentions that a harvest of grain is obtained every 30 or 40 years from the soil of the Luneburg heath, by strewing it with the ashes of the heath plants growing upon it. The plants, during the period just mentioned, collect the alkalies contained in the soil and conveyed to them by rain-water; and it is by means of these the crop is enabled to grow on this sandy heath.

"The most carefully conducted chemical analysis of a soil only leads us to the discovery of certain principles which exist in very small quantity, although their action is unquestionably useful to vegetation" (p. 275).

The *certain principles* here referred to are the inorganic elements of soils, which, in accordance with his theory, are merely noticed as being useful; whereas, in truth, upon their presence in sufficient quantity the fertility of every soil depends.

"Recent inquiries have shown that chalk contains a small quantity of phosphate of lime and salt, as we shall see by and bye, whose presence is always desirable in arable lands" (p. 304).

Phosphate of lime is merely desirable in land: he could not possibly say that it was an essential constituent; though he speaks strongly enough at page 327: "*It is a law* that every fertile soil *must contain* or *receive dead organic matter*;" and also *vide est* page 309 "whatever may be—&c."

"To permit the exportation of oilcake is to hinder the husbandman from taking advantage of all the circumstances with which nature presents him; it is as if a chill were to be brought over the genial climate of France. Upland meadows, when they have not been soiled, yield miserable returns, and their situation renders them difficult of access, oil-cake in such circumstances comes powerfully to our aid.

	s.	d.
220 lbs. of hay containing 3 lbs. of azote, will be worth.....	5	0
To produce which, 56 lbs. of cake (3.3 lbs azote) worth	1	8
would be required.		
Difference in value between cost and crop (p. 395)."	3	4

Oil-cake is here valued for its azote alone, and the soil of France is to be rendered unfruitful by the exportation of this azote; however, if *the mineral elements* of the cake are by some manure returned to the soil, it will not suffer; but these M. Boussingault never thought of, otherwise he could not tell us that 56 lbs. of cake *would produce* 220 lbs. of hay; for it is an absolute impossibility, because this quantity of cake *cannot* supply the mineral ingredients required by the hay. In Egypt, where wood is scarce, dried excrements form the principal fuel; for centuries the sal-ammoniac used in Europe was supplied from the soot of these excrements. Holland has for centuries exported millions

of cwts. of cheese; but the exportation thus of azote from these two countries has not diminished their productiveness.

"From what has now been said, it will be understood how destructive to good manure is the custom of turning dung heaps, of airing them as it were, in order to hasten decomposition. Treated in this way, stable litter, &c., does decompose much more rapidly; but it does so—and I own that I do not myself clearly perceive the object proposed by it—at the expense of the quality, for it is very evident that the volatile principles must be dissipated and lost, in proportion as their points of contact with the air are multiplied" (p. 340).

It is quite certain that dung cannot act as a manure until it is decayed: it is the province of vegetable life to form from the inorganic elements of soils organic matter to serve as food for men and animals: this food is again by them reduced more or less to its elementary state, and expelled in the excrements; these applied to land, by restoring (when completely decayed) the inorganic elements, supply again the conditions, the necessary constituents for the support of vegetable life. The volatile ingredients of dung, which are lost by its decay, came originally from the air; and whether the decay takes place in the land or in the farmers' yard, to the air they will go again. The ammonia of dung heaps may be preserved by gypsum, and it may perhaps be profitably used for the purpose, although ammonia is present in all soils, in large quantity, and also in the air, for the use of plants.

"Agriculturists have in all ages admitted that the most powerful manures are derived from animal substances; an opinion, or rather a fact, which expressed in scientific language amounts to this, that the most active manures are precisely those which contain the largest proportion of azotised principles" (p. 332).

It is not fair to value manures in proportion to the amount of azote they contain; in all animal substances, with this azote are associated sulphur, phosphorus, and alkalies; why should not their good effects be ascribed to these rather than to the azote? Azote, as ammonia, exists *always* in soils and in the air; but the phosphorus, sulphur, and alkalies are often wanting in soils, or present in too small quantity; and the supply of them must be therefore most essential, if indeed they are not the only essentials to be supplied. True enough the sulphate of ammonia alone, and guano alone, have caused good crops; but so likewise have lime, salt, wood-ashes, gypsum, superphosphate of lime, sulphate of soda, fallowing, paring and burning, carbonate of soda and potash, &c.; the action of which cannot be ascribed to azote, inasmuch as they contain none. We cannot say guano acts in virtue of its azote, for it has been over and over again used, mixed with ashes, and often *with better success than when applied alone;* in such cases it could only act by its phosphates, (the ammonia being driven off,) and that it does act by its phosphates is further proved because in soils rich in phosphates it has always failed, or produced very little effect; and on the very same soils the alkalies and ashes have done good, although manures entirely without azote or ammonia. The sulphate of ammonia may act in virtue of its sulphur, and it may act especially by rendering the phosphate of lime in soils more soluble; however, both it and guano must always exhaust land, and neither can do the slightest good unless the soil contains all the other essential inorganic constituents of plants; and the recommendation of the use of either, alone, is tantamount to recommending the exhaustion of the soil. The action of nitrate of soda has been ascribed to its nitrogen, but there are several experiments on record where on the same soils carbonate of soda has effected as much as the nitrate; in which cases the benefit must have been due to the base soda. Experiments made with carbonate of ammonia show that alone it produces little or no effect, yet according to Boussingault the carbonate is the most likely salt of ammonia (although so volatile) to act beneficially, and he quotes the experiment of Davy in illustration; but in this experiment the effect may quite as fairly be ascribed to the *heat* and moisture imparted to the soil; at all events, ammonia cannot in the way adopted by Davy be applied to land.

Other experiments have been made with urine and bullocks' blood, &c., showing that wheat is richer in gluten grown with these, than with manures formed from the dung of various animals; but these experiments are worth nothing, unless it can be shown that the phosphates, sulphates, and alkalies supplied by the dung were *equal in quantity and in as soluble* a condition as the like ingredients supplied by the urine and blood. That they would not be supplied in so soluble a condition I think is certain; and if so, the conditions of growth were not equal. If the supply of azote were so essential—if to it chiefly manures owe their action, how is it that we are able to increase the crop of azote on land by the use of lime, ashes, marl, paring and burning, salt, superphosphate of lime, &c., by substances which do not supply azote? Boussingault himself proves that land produces more azote that is given it in manure; and the following rotation (during which the land is only once manured,) adopted in Alsace, shows that the action of manure does not depend upon its azote—

First year: Manured; potatoes or beet. Second year: Wheat. Third year: Clover. Fourth year: Wheat, and fallow turnips. Fifth year: Oats, rye, or barley.

Now, if we suppose the action of the manure due to its azote or ammonia, it is obvious that a progressive diminution must ensue; that the azote of the crops of the first and second years must amount to more than that contained in the crops of the fourth and fifth; but this opinion is completely opposed to the following analysis :—

AZOTE IN THE CROP.

First year.	Second year.	Third year.	Fourth year.	Fifth year.
46·	35·4	84·6	56·	28·4

Thus in the third and fourth years the azote in the crops amounted to much more than the first and second; and in the fifth the quantity was only one-fourth less than it was in the second year. Now, is it possible or conceivable that this azote, given in the first year as ammonia—a body of great volatility, and very apt to evaporate along with water—could have been present in greater quantity in the soil during the fourth year than it was in the first and second years; or that it could yield to the oats of the fifth year the necessary quantity of azote for their growth. Compare this rotation with that followed in Bingen, where a nine years' rotation is adopted in the order following :—

First year: Turnips, manured. Second year: Barley and lucerne. Third, fourth, fifth, and sixth years: Lucerne. Seventh year: Potatoes. Eighth year: Wheat. Ninth year: Barley.

Six years after manuring, after the supply of ammonia and manure containing azote, the soil of Bingen yields rich crops of potatoes, wheat, and barley; and these succeed each other at a time when, according to the *assumption* that manure acts by its azote, the manured field in Alsace was to be viewed as completely exhausted of azote. Can it be conceived that the ammonia of the manure could, after the lapse of eight or nine years, furnish the azote to the crops of wheat and barley? But even admitting this to be the case, we have then to inquire whence do the corn field in Hungary, in Sicily, or in the vicinity of Naples receive their azote, for these fields have never been manured? Are we actually to believe the nutrition of plants in moderate climates subject to different laws from those governing the warmer and tropical regions? In Egypt, where wood is scarce, dried excrements form the principal fuel; and the fields in the valley of the Nile receive no manure but the ashes (which contain no azote) of the burnt dung; and yet their fertility has become a proverb, and it is quite as remarkable at the present day as in former times. These fields become renovated by the mud deposited during the inundations of the Nile, the mineral ingredients of the soil being thus restored. The mud of the Nile contains as little azote as the mud from the Alps, fertilizing our own fields by the inundations of the Rhine.*

By the exportation for centuries of the azote contained in cheese, the productiveness of the meadows in Holland has not been diminished, although they have never received *by manure* more azote than they originally contained. The whole population of Limousin subsist upon milk and sweet chesnuts; and without being subjected to any system of farming, this district produces enormous quantities of the constituents of the blood, the azote of which cannot have been derived from manure. For centuries, in Hungary and Virginia, wheat and tobacco have been cultivated on the same field without any supply of azote. Our forests of beeches, chesnuts, and oaks become covered with leaves every year; the leaves, sap, acorns, chesnuts, cocoa nuts, the fruit of the bread-tree are rich in azote. This azote has not been supplied by manure. On the fruitful corn-land around Naples, corn has been cultivated for thousands of years, without any part of that which is annually removed from the soil being restored to it: a field is ploughed once every three years, and in the interval lies fallow, during which it is exposed to the influence of the weather, by which a fresh portion of its alkalies &c. are again set free or rendered soluble. From what has been shown, it is clear that to value manure according to its azote must be erroneous; that its true value consists in its inorganic constituents; and that on the presence of these, or the supply of them in sufficient quantity, and in a state fit for assimilation, depends almost entirely the productiveness of land. When the advocates of the organic theory can *by it* explain the action of lime, ashes, and fallow upon land, or the production of more azote in a meadow (manured with ashes) than on highly manured arable land, it may be believed in; but it is useless to expect faith in a theory so totally inedequate for the ends proposed, and so unable to account for facts which it has brought forward, and ought, if not utterly worthless, to be able to explain.

P. S. I am indebted to extracts from Professor Liebig's excellent works for much of this article.

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* Liebig, p. 210.

ON THE EXTRAORDINARY AMOUNT OF PHOSPHORIC ACID FOUND IN A BLACK FLAKY MARL AT BROUGHTON, WILTS.

Sir,—As chemical investigation, conducted in a rigid, careful manner, alone is the means whereby we can attempt to unravel the mysteries of nature, and in some measure account for the various secret operations daily proceeding under our hands, I beg to hand the result of an examination which has lately occupied my attention, that promises to be of great practical importance, both as regards its individual benefit, as well as by drawing the attention of scientific men to this all-important subject, to encourage them to devote their time to its strict investigation, and by experiment render that assistance which we practical men require, in endeavouring to solve the problem how to apply the marl in the most judicious manner, and render it available to a distance.

The assistance which agriculture is daily receiving through the aid of chemistry is so plainly demonstrated by the rapid strides of improvement continually progressing, sweeping away by its magical influence the prejudices of years, and carrying conviction to the mind of the most sceptical, that I think I am not too presumptuous in saying that the learned Professors of Agricultural Chemistry would confer an immense benefit upon that part of the community by turning their attention to this subject.

It is with some degree of confidence that I lay this subject before you, as the examination was carried on in a strictly impartial manner; and the result, however extraordinary, serves to corroborate the opinion of another gentleman upon the subject, as well as convincing me that the examination is correct, however doubtful I might have been previous to his communication.

The Wilts, Somerset, and Weymouth Railway, now in formation through this parish (Bradford), cuts through the middle of a farm occupied by Mr. Dark, of Broughton—a gentleman highly respected as a first-rate agriculturist. The company in cutting through his farm came to a "black marl," which they offered to lay on his land adjoining at the rate of 100 loads per acre, which he agreed to, whether it would eventually prove beneficial or not; at a visit, he requested me to give my opinion upon it, which at the time I declined doing upon only a superficial glance at the substance, as I did not wish to advance any supposition or theory respecting its effects, which might have suggested itself, unless I could substantiate my opinion by some practical knowledge respecting its mineral constituents; but as it was a substance I had never met with before, I undertook to make an accurate analysis of it, as much for my own satisfaction as for his. The following is the result of my labour:—

THE ANALYSIS OF 100 GRAINS.

Moisture, 12½ grains	12·50
Organic matter, 22¼ grains	22·25
Silica, 34 grains	34·00
Phosphates, 7½ grains	4·30
Iron with impurities of alumina—the iron estimated at 5 grains, the alumina half a grain	5·50
Alumina 9½ grains	9·50
Alkaline salts—magnesia, potash, and soda, 8½ grains	8·50
Sulphuric acid	·732
Chlorine	1·594
	98·876
Loss	1·124
	100 grs.

The first object that attracted my attention in conducting the analysis was the total absence of lime, the slightest trace of which I have been unable to find, as this is in most marls the principal ingredient, to the presence of which they owe or are thought to owe chiefly their fertilizing properties. It struck me as rather an extraordinary circumstance; for the marl, which is applied so plentifully to the dry sands of Norfolk, contains 98 per cent. of carbonate of lime—a very soft, soapy kind of substance, easily dug with a spade, breaks down in a finely divided friable state when exposed to the influence of the atmosphere, and is found of immense benefit in its application by making the ground firmer in its texture, and of being the means of applying to the soil a substance it was deficient in, but might possibly have the opposite effect if applied to land already containing an excess of lime.

The next substance of importance was the immense quantity of phosphates; when I came to that part of the analysis (their separation from the other ingredients) I was astonished at the quantity, and could not at first believe I could be correct—so much so, that I put it on one side, fully persuaded some mistake had arisen, and commenced upon a fresh quantity, but with the same result; being particularly careful this second time that each process should be conducted with the greatest exact-

ness, to guard against any misconception. As I had never in any mineral substance or soil, that I have examined, found the phosphates in anything like an appreciable quantity, I was surprised to find them here in such excess.

The soil that I found the greatest quantity was from the "Heart" hop-ground at Farnham, known as some of the richest land in England. From a portion of soil taken 5 or 6 inches from the surface 100 grs. contained ·287 phosphates; another similar quantity taken 3 or 4 feet below the surface gave ·861; many soils of a fertile character which I have analyzed at different times gave but a very small portion, and in many but a slight trace only could be found.

To those acquainted with the most approved method of analyzing soils, it is known that the separation of the phosphates is the most delicate, tedious, and difficult, and, owing to its importance, the most anxious operation of the whole analysis, and requires upon the part of the operator the utmost care and attention lest they pass unobserved; for existing (in the quantity of soil I generally take viz. 100 grains) in such a slight proportion, but owing to the immense importance of their being present, it becomes necessary, in making an examination, to be extremely careful to astertain their presence and proportion.

It is rather a singular circumstance that I concluded my examination of this marl only a fortnight before I read Mr. Nesbit's interesting letter in your magazine, upon the same subject, and am happy to find another has made the like discovery, though with quite a different substance. I am perfectly acquainted with the description of marl he mentions, it being a dull green colour, very friable, easily acted on by the atmosphere, and mixing well with the soil. The marl in question is of a brownish black colour, flaky in its character, somewhat of the appearance of slate, breaks down easily by being exposed to the influence of the atmosphere, and is found about six feet from the surface; but owing to the short time that it has come under my notice, I am not in a position at present to state so fully as I could wish as regards its geological formation, but shall endeavour to ascertain the course it takes through this county, which may perhaps afford more than individual satisfaction. The quantity Mr. Dark is applying, viz. 100 loads per acre (which, allowing 15 cwt. to the load, is equal to 75 tons) at 4½ per cent., is equivalent in fertilizing properties to an application of bones at the rate of 3 tons 7 cwt. 1 qr. 16 lbs. per acre. Such an immense quantity never in the annals of agriculture, I apprehend, has been known to be applied to a single acre. It is also exceedingly rich in the alkaline salts, and those of a very strong character; for the quantity mentioned, though calcined in a porcelain crucible at eleven o'clock at night, and left in the crucible, by 9 o'clock the next morning were found to be in a very damp condition. By comparing this with the analysis of the Heart hop-ground, which I take as the criterion of a thorough good soil, the quantity is nearly double, for that which was taken 5 or 6 inches from the surface yielded the three salts together 4·75; that taken 3 or 4 feet, 3·50.

As a passing remark respecting the application of this immense quantity, the only fear to be entertained is, whether for the succeeding two crops it may not be injurious; but then again, being applied to land holding already an excess of lime in its constitution, whether that will not in some measure counterbalance its anticipated injurious effects. There are, no doubt, locked up in the treasury of nature, riches of a most inexhaustible character, which only require the aid of chemical science to unfold their valuable properties, to render them serviceable to the practical man. For ages past they have lain dormant and unnoticed, unless here and there an individual instance has occurred of the beneficial application of this or that mineral substance; but nothing like any certain or definite opinion has been advanced, as respects its application; experience only proving that in one instance its application was beneficial, in another detrimental, without any reason being assigned for the different results, owing to the absence of the knowledge of its mineral constituents; which without the aid of chemistry would be impossible to be ascertained with that degree of accuracy as to be of service for practical purposes. We farmers are too apt to draw our conclusions in too general a way, and because such a substance has been used beneficially at a certain place, we conclude it will act the same with us, not considering that our land may be of a completely opposite character: a falser kind of reasoning than this cannot possibly be. When we consider the general diversity of kind and substance diffused through nature (the vegetable kingdom especially), it would be folly to suppose that the general law did not apply to the soil; but practical experience proves that it does; and chemical investigation shows that there is as much difference in the mineral constituents of soils as there is in the constitution of the human race, and that they require to be treated accordingly. In this age of enquiry and research, when scientific men are turning their attention to agriculture, the difficulties under which we labour may in some measure be got over, as it can be only by combining the two principles together—practice and theory—that a satisfactory conclusion can be expected to accrue from the researches of those who are not practical men.

In tendering the above observations to your

notice, it is not under the impression that they will be the means of imparting any instruction in a field of nature hitherto unexplored, but that they will aid in diffusing that knowledge which is at all times instructive and satisfactory; and trusting some abler pen than mine may be induced to give publicity to investigations hitherto wrapped in mystery or concealed in the precincts of the laboratory, I remain sir, Your obedient servant,

GEORGE AUSTURICK.

Hunts Hall Farm, Holt, Wilts. 8th Feb. 1848.

DECOMPOSITION OF COMMON SALT.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—In the *Farmer's Almanac* of 1848, a mixture of common salt and quicklime is recommended as a manure, in the proportion of one part of salt and two of lime. It is therein stated, that by allowing the mass to remain undisturbed for two or three months, two salts are produced—carbonate of soda, and muriate (or, rather, chloride) of lime. How this result takes place is not very evident; but that it does do so is undeniable.

In the Memoirs of the Stockholm Academy, for 1779, there is a short but curious paper of Scheele, giving an account of some results which he had obtained, respecting our present difficulty. If a plate of iron be moistened by a solution of common salt, or of sulphate of soda, and left for some weeks in a moist cellar, an efflorescence of carbonate of soda covers the surface of the plate. The same decomposition of common salt and evolution of soda takes place when unslacked quicklime is moistened with a solution of common salt, and left in a similar situation.

Dr. Thomson observes, upon these experiments, that the phenomena themselves are wrapped up in considerable obscurity.

Berthollet attempted an explanation in his *Chemical Statics*, which is as follows. His theory is, "that quantity may be made to overcome force; or, in other words, that if we mix a great quantity of a substance which has a weaker affinity with a small quantity of a substance which has a stronger affinity, the body having the weaker affinity will overcome the other, and combine with a third body in place of it." A number of instances of this kind of decomposition were mentioned by him; amongst others, he showed that a large quantity of potash, when mixed with a small quantity of sulphate of barytes, is able to deprive the barytes of a portion of its sulphuric acid. In this way the decomposition of common salt by carbonate of lime, in the soda lakes of Egypt, was accounted for by him; and also of the same salt by iron, as mentioned by Scheele.

All this seems quite unsatisfactory to explain the point in question; and I fear that chemical decomposition is a phenomenon of so complicated a nature that it is very difficult, if not quite impossible, in the present state of science, to analyse the process with accuracy.

I remain, sir, yours most obediently,

G. W. TUCKER.

34, Carey-street, Lincoln's-inn.

YEOVIL.—AGRICULTURAL SOCIETY.—The annual business meeting of this society was held on Friday se'nnight, at the Three Choughs Inn, Edward Rodbard, Esq., in the chair. The Honorary Secretary (Mr. J. N. Highmore) read a letter from H. B. Strangways, Esq., offering to give two silver cups, of the value of £5 5s. each, for the landlord and tenant, who under tenant-right principles had undertaken and completed the greatest amount of draining, not less than 10 acres, the drains to be not less than 4 feet deep, nor more than 30 feet apart. It appeared to be the general feeling of the meeting, that as the principles of tenant-right were not clearly defined, and but vaguely understood, and as the society held various opinions upon the subject, that the introduction of the question would have a tendency to disturb the harmony of the society, they therefore considered it to be more prudent to decline (at least for the present, until the subject of tenant-right assumed a tangible form) the offer of Mr. Strangways; though, at the same time, they could not but feel deeply grateful to that gentleman for the liberal offer which he had made, and the public spirit which dictated it. On the motion of Dr. Tomkins a vote of thanks to Mr. Strangways was passed unanimously. Mr. Highmore stated to the meeting that Mr. Acland, the late member for the Western Division, had withdrawn his prize cup from the society, on the ground that being no longer a public man, he felt it his duty to confine his subscriptions to the institutions in the more immediate neighbourhood of his father's property. The honorary secretary mentioned the circumstance of a competitor at the last show having exhibited and obtained a prize for a colt, which he affirmed, "on his honour," had been bred by himself, but which, it was subsequently discovered, had been purchased by him at a sale; however, as the prize money had been returned, the subject was allowed to drop. On the motion of George Harbin, Esq., seconded by John Batten, jun., Esq., Edward Rodbard, Esq., was unanimously elected to preside at the next annual dinner.—Sherborne Journal.

T

RAISING TURNIPS ON CLAY LANDS.

The aluminous base of clay imbibes fifteen times its own weight of water, and retains it with great obstinacy. The cold cements the particles of the soil, and denies the admission of "caloric;" which would dissever the atoms, and render the land porous and permeable. The viscous tenacity that is thus produced is altogether invincible, and defies the reduction of the soil to the necessary fineness of tilth for the growing of turnips. The land lies in clods that are beyond the power of being penetrated by the tender roots of young plants, and the vacancies between the clods are open to the drought, which kills every vegetation.

During my frequent visits to the Royal Farms at Windsor, that are under the management of Major Gen. Wemyss, I was much struck with the methods of raising turnips on these farms. Sowing on the flat surface is preferred to the drill system, as it does not so much expose the land to drought and evaporation during the processes of being formed into ridgelets and reversed to cover the dung, and the flat surface keeps moisture better than the raised drills. The turnip-lands at Windsor are wrought by ploughing, harrowing, and rolling, in the usual way; the dung is laid down and spread broadcast, and the land is ploughed into ridges of twelve or fourteen feet. On these ridges the turnips are sown in rows, by the corn-drill. The scuffling of the intervals, and the hoeing of the rows, are done in the usual way.

On the stiff lands on which turnips are grown, but which are not properly turnip-soils, the land is wrought as fine as possible in the usual way, and the dung spread upon it in broadcast. It is then gathered up into ridges of six or eight feet, harrowed, and the turnips sown in three or four rows on a ridge. This method does not expose the land to drought and the loss of moisture.

A corollary of some importance may be drawn from this very successful practice of Gen. Wemyss. The growing of turnips on pared and burnt lands, where the seed is sown on the unploughed surface that is covered by the ashes spread upon it, shows that the tap-root of the turnip does not require a depth of pulverized soil below it, in order to favour or allow its descent, and that the encouragement which the plant receives at the surface of the earth will induce the downward progress. Hence, if clay lands be pulverized at the top, and the manure there applied, the tap-root will go downwards, and the bulb will be formed.

Clay lands may be wrought in the usual way as finely as possible—say to the middle of June; the dung may be laid down and spread in broadcast, and the land then gathered up by one ploughing into ridges of six feet. The surface may then be harrowed fine by means of harrows attached to a maintree stretching over the ridge, and drawn by horses walking in the furrows. The turnip-seed may then be sown in three rows, by means of a sower constructed for the purpose. The scuffling of the intervals, and the hoeing of the rows, may be done in the usual way; and as these wet lands do not admit sheep to feed on the ground in winter, and being too soft to allow carts to carry away the turnips, horses with creels on their backs may walk in the furrows, and carry home the roots in the hampers, or into carts at the gateway. This method may prove very useful, after clay lands are drained.

Every vegetable is best in quality that is raised on clay soils; any farmer is aware of this fact. As I observed in a former paper, "Some easier process *must* exist, than the present very laborious and costly modes of raising the fruits of the earth." J. D.

Agricultural Institution, Hoddesdon, Herts, Feb. 17, 1848.

LONDON FARMERS' CLUB.

MONTHLY MEETING OF THE COMMITTEE OF MANAGEMENT.

MONDAY, Feb. 7.

Present—Messrs. W. Bennett, G. Emery, W. Fisher Hobbs, W. Hutley, C. W. Johnson, T. Knight, J. Pain, W. Purser, T. Owen, W. Shaw, and J. Tyler: W. SHAW, Esq., in the chair. The minutes of the last Meeting were read and confirmed, and signed by the chairman of this day.

The following gentlemen were elected members:—

R. Allen, Bradfield, Sussex
C. D. Archibald, Guildersfield, Surrey
G. E. Frere, Roydon Hall, Norfolk
J. P. Lawrence, Cambridge
J. Miles, Wexcombe, Wilts
E. C. Peake, By-fleet, Surrey
J. Paul, Thorpe Abbotts, Norfolk
S. Skelton, Sutton Bridge, Lincoln
C. H. Smith, Derwen Four, Glamorgan.

The names of seven other gentlemen proposed as members were read for the first time.

It was resolved that a book be opened for registering estates and farms to be sold or let, on the payment of a fee of half-a-crown for every entry made.

A variety of other business connected with the management of the Club House was disposed of, and the Committee broke up shortly before five for the discussion.

A COMPLETE TREATISE ON PRACTICAL LAND-SURVEYING IN ALL ITS DEPARTMENTS.

By A. NESBIT, Land Surveyor.

London: Longman and Co. 1847.

We have seldom seen a more complete or better arranged work connected with land-surveying. The editor is author of several practical works, viz., on arithmetic, mensuration, gauging, &c., &c. The present work has now reached its ninth edition, and an addition has been made of "plane trigonometry" and "railway engineering," including the principles and practice of levelling, &c., &c. The whole is illustrated with woodcuts, copper-plates, practical examples, and an engraved field-book of sixteen pages. It is divided into seven parts, each containing a distinct and separate subject in itself; and all together forming a compendious whole, explanatory of the business of land-surveying. The field-book being detached from the surveying department, will be found extremely convenient in laying down large surveys. The author is fully competent to the task, being the master of the well-known academy at Kennington, near London.

METEOROLOGICAL DIARY—1848.

	Barometer.		Thermometer.			Wind and State.		Atmosphere.		
Day.	9 a. m.	9 p. m.	Min.	Max.	9 p.m.	Direction.	Force.	9 a. m.	2 p. m.	9 p. m.
	in. cts.	in. cts.								
Jan. 22	30.16	30.06	30	32	29	N. East	gentle	cloudy	cloudy	cloudy
23	30.11	30.30	29	32	30	N. East	gentle	cloudy	cloudy	cloudy
24	30.39	30.39	29	33	31	N. East	forcible	cloudy	cloudy	cloudy
25	30.40	30.30	28	32	30	N. East	forcible	cloudy	cloudy	cloudy
26	30.14	30.14	25	31	24	Easterly	lively	cloudy	cloudy	cloudy
27	30.09	30.04	22	32	25	Easterly	strong	fine	sun	cloudy
28	29.90	29.91	18	31	26	S. East	variable	fine	cloudy	cloudy
29	29.95	29.98	26	40	36	South	gentle	cloudy	sun	fine
30	29.85	29.50	36	44	44	S. Westerly	brisk	cloudy	cloudy	cloudy
31	29.91	29.41	33	40	34	N. East	gentle	fog	cloudy	cloudy
Feb. 1	29.89	30.10	30	40	34	W.byN.,S.W.	gentle	fine	sun	fine
2	30.20	30.33	30	45	38	W.by N.byS.	gentle	fine	sun	fine
3	30.41	30.35	37	44	37	S. West	lively	cloudy	sun	fine
4	30.20	30.20	37	44	37	S. West	lively	cloudy	cloudy	cloudy
5	30.20	30.19	37	50	38	S. West	&calm	cloudy	cloudy	cloudy
6	30.18	30.20	47	52	51	S. West	gentle	cloudy	cloudy	cloudy
7	30.14	29.91	46	50	47	W. by South	lively	cloudy	cloudy	cloudy
8	29.91	29.80	42	48	46	Westerly	gentle	cloudy	cloudy	cloudy
9	29.30	29.20	44	48	48	W.byS., by N.	forcible	cloudy	cloudy	fine
10	29.20	28.90	38	45	40	S. West	gentle	fine	sun	cloudy
11	29.10	29.60	38	48	39	W. N. W.	gentle	fine	sun	fine
12	29.90	30.—	35	46	40	West	lively	fine	sun	fine
13	30.12	30.05	41	47	47	South	brisk	cloudy	cloudy	cloudy
14	29.95	29.80	46	50	47	S. West	lively	cloudy	cloudy	cloudy
15	29.60	29.60	45	46	41	S. to West	variable	cloudy	cloudy	cloudy
16	29.74	30.04	33	44	37	W.byN.,N.	gentle	fine	sun	fine
17	30.22	30.45	33	45	35	N. by East	gentle	cloudy	sun	fine
18	30.46	30.26	33	39	31	N. E., S. W.	gentle	cloudy	sun	fine
19	29.91	29.73	31	46	42	S. W. West	brisk	cloudy	cloudy	cloudy
20	29.50	29.74	38	44	37	North	gentle	cloudy	cloudy	fine

ESTIMATED AVERAGES OF FEBRUARY.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.82	29.170	53	21	38

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
42.266	34.566	38.416

Weather and Phenomena.

Jan. 22 to 26: Sunless gloom; mercury very high; cold increasing. A little snow on 23rd. 26, 27: Piercing wind. A little snow on 27 and 28—the two most severe days! 29: Beautiful; thaw commenced—30, confirmed. 30: Rain in night, and also for many hours. 31: After fog, sleet greater part of this day.

Lunations.—Last quarter: 28th day, 1m. before noon.

Feb. 1, 2, 3: Fine and sunny. 4: *Rain*, chilly; commencement of six days' gloom. 5: Brisk, rain in night. 6 to 15: Warm period, with south westerly wind. 7: Rainy evening. 9: *Rain* in last night. 10: Fine till evening; then profuse rain. 11, 12: Beautiful. 14: Drizzling rain. 15: Much *rain* in night, with wind; day rather showery. 16: Generally bright. 17: Slight rime, early—18, the same; fine day. 19: Frost; a little ice—snow—rain—thaw. 20: Cloudy; change of wind; keen clear night.

Lunations.—New moon: 5th day, 1h. 42m. morn. First quarter: 11th day, 7h. 56m. afternoon. Full: 19th day, 3h. 22m. morning.

The phenomena to be observed are the remarkable mutations of this period: great elevations and sudden depressions of the barometer, periods of sunless gloom, with scarcely any relief; the finest interval being coincident with the lowest state of the mercury—and *vice versâ*.

The Condition of agriculture during this peculiar season may be safely reported as most promising. Every thing in this vicinity is fine, with no apparent injury, either from weather or vermin. Nothing can be predicted, but *hope* is well grounded. The *rain here* is below average, and the springs are still very low. J. Towers.

Croydon, Feb. 21.

CALENDAR OF HORTICULTURE.—MARCH.

March is, perhaps, the busiest month of the year; if at all seasonable, the weather will be very changeable during the first fortnight, subject to cold showers, sleet, perhaps scuds of snow, alternated with brilliant sun-gleams, but, under all circumstances, with a condition of the air which is always drying and productive of rapid evaporation; hence the operations of the garden are seldom retarded unless hard frost prevail, and this is always unpropitious and of doubtful prognostic. At the approach of the vernal equinox—which, in the present year, will fall on the 20th day, 44 minutes before noon, the sun then entering the sign of the ram—the wind ought then to become northerly, the sky clear and serene, and the temperature mild, thus affording a hopeful promise of a benign and genial summer. The most fertile summers, with few exceptions, have followed such indications, which of late years have been of too rare occurrence.

Vegetable Garden.

We presume that our leading principles will be observed; these are, first, the complete removal of subsoil water by efficient drains; second, the thorough laboration, by spade and fork, of the earth to the depth of at least twenty inches, or, in its place, the introduction of loamy soil to supply the deficiency; third, the gradual raising of a certain portion of subsoil at every trenching, with the incorporation of manure to the full depth.

First week.—Broad Beans.—It is a great error to plant late; the black aphis (dolphin) rarely fails to attack late beans just as the flower expands, and in dry seasons to render every flower barren, and often to destroy the whole plant. Sow, therefore, now, in deep moderately rich soil, cover two inches, and make the surface pretty firm. January and February are the best seasons for garden beans, October to December for those of the field. Beans now sown may be the Sandwich, Spanish, green and white Windsor; and any, or all, may go in along the early pototo rows and between the sets.

Early Potatoes.—Finish all the earliest sorts, planting four or five inches deep and six or eight inches apart. White coal-ashes, such as those from the true Hartley sea-coal or the inland Moira and Wednesbury, abound in calcareous and potass carbonates, like the ash of wood. Such ashes trickled in the holes of dibbled sets, or along the course of drilled rows, cannot be injurious, being congenial with the potato.

Cabbage.—Sow every variety of this family, except broccoli, in an open seed-bed of good loam or earth, not made rich, viz., hearting cabbage, savoy, cauliflower (in a frame), Scotch and Jerusalem kale, chou de Milan, borecole, and Brussel's sprout. By these sowings time is gained, and any of the sorts may be retarded by timely removal to nursery-rows, so that a season may be greatly prolonged.

Scatter guano in small quantity over the earth between the autumn plants, and then dig the ground, or rather fork it, as the fibres will be less injured; the plants will soon prove by their colour how much their vital action is thus invigorated. I bear testimony to the superiority of pure Peruvian guano over every other artificial manure for the cabbage tribe; even one ounce, with a gallon of water to each plant of a bed of York's doubled the size. Soils may and will make a difference, but I now allude to the firm hazel loam of Maidenhead Thicket. At all events, good guano is comprehensive of almost all the essential inorganic salts.

Lettuce.—The best Paris and the London "union" may be sown now, and some of the "winter-protected" transplanted; very rich and mellow ground is required, and also a ready supply of soft water. This last named article is one of the chief adjuncts of the London market-gardens, wherein rills of soft Thames water abound.

Onions and leeks cannot be sown too early; the latter in drills for transplantation.

Radish seed of every description sow early, and again, as required; also carrots (the horn first), parsnips, and red beet.

Kohl rabi is an admirable bulb for the farm; it, or something very like it, is used as the greatest delicacy in India, under the name "knol khol," but there the vaporous heat of the climate forces the plant forward with a rapidity that is not appreciated with us. They who have large gardens and spare ground would do well to sow a few poles therein *for the field*, in drills eight inches apart, where the seedlings could be kept clean and handily thinned. I once knew this to be done for one of the large sheep farms of Bucks; the plants were moved in June for sheep feed in the autumn and winter. In very mild and showery weather kohl will grow so rapidly as to become fit for table use, like the rutabaga or Swedish turnip.

Peas of every kind are sown immediately, or in

The *Second week.*—These sowings are arbitrary as wanted, but after the first crop of winter the seeds

are generally put in much too thickly in the drills: half an inch apart would be close enough; the peas would germinate more freely, and bear better. The great art is to preserve them from mice by a liberal covering of chopped fresh furze, aided externally by traps and a vigilant cat or two.

Summer spinage, to succeed, must be frequently sown, and gathered when in its first strong leaf, for it is sure to run to flower. The winter, or broad-leafed prickly-seeded, is now coming on, and if duly hoed and manured between the rows, is so productive that we greatly prefer it to every variety.

Celery.—The Seymour's white and the large purple should be sown early on a little heap of tree leaves, earthed, and covered with a hand-glass. A deep and wide seed-pan, the soil of which is mainly decayed manure, frequently produces plenty of good plants.

Third and fourth weeks to the end.—Repeat all the required sowings; add capsicums under glass, also the tomatos, or love apples, parsley of both kinds, small salad, turnips for early summer.

Potatoes.—The second supply, to come in by September, and these are the varieties which ought to be made our reliance as stock; for though we would not reject the latest blues, regents, &c., yet we would cultivate for seed experimentally, and to keep up the stock, and not as food. The early champions, the early and later true shaws, the Lancashire later kidney, and the purple-eyed white (called locally "prince's beauty"), are sufficient, and if dug before the cold autumnal rains occur, will keep in cool dry stores just as long as the other winter varieties.

Asparagus.—Fork the beds, scatter decayed leaf-earth over the rows, and commence salting the surface. Prepare new beds, and sow good seed, two drills to a bed.

Artichoke.—Dig in the manure, and clear away decayed leaves; trench deep, and manure for new offset plants.

Kidney beans and *runners.*—Sow plenty in pots of light earth for transplanting; place them under cover of a hand-light or in a frame; these will secure the seed and economise time.

Plant Jerusalem artichokes, as potatoes, rhubarb, mint, thyme, sage, majoram, basil, rosemary, lavender, rue.

The hoe and hand fork must be employed to loosen and clean the surface, and every rising crop of beans and peas is to be duly earthed up, and the latter effectually and neatly staked. The hasty and rude method too often practised is a disgrace to the garden.

In every department the usual and so often urged attention to neatness and order must be sedulously bestowed. Wall trees are to be regulated, the walls syringed with tobacco water before the blossoms expand, the surface of the ground forked, and mulched with littery manure.

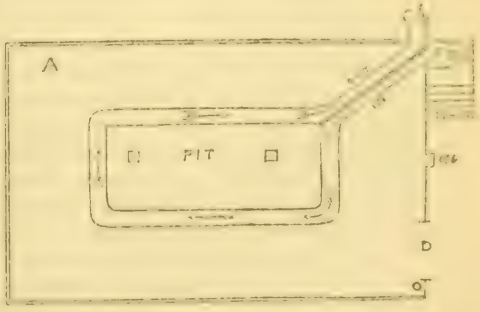
Plantations of strawberries from prepared runners of last summer are to be made early before the ground becomes dry; the best method is to dig deeply, and to plant in rows three feet apart every way; these spaces will give room for the early runners to root well, and save much confusion and trouble.

Evergreens.

Parties are at issue concerning the time of planting; some assert that April is the proper month, particularly for the holly; others, of high authority, advocate the early winter months. I have had success at all periods, and have known thousands planted at any time between September and April. Each plant should be deposited with the utmost speed after it is dug up, and the smaller the size the better; but then everything depends upon careful planting in well prepared fine earth, made to touch and press upon the fibres, and a moist state of the ground and atmosphere; aridity and hot sun are the destruction of fresh-planted evergreens.

I must now refer the reader to former calendars of direction for the ornamental departments and glazed erections, in order to fulfil a promise long since made to present a plan of a forcing-house, which, I think, will reconcile the disputes between the parties who approve or condemn the system called "Polmaise."

The annexed simple cut has been elsewhere defined, and the house has met with approval. I know its construction, and witnessed its efficiency, having been present when the first fire was lighted. The dimensions in length, breadth, and height, are arbitrary.



A is the internal area, inclosed by brick walls nine inches thick, a yard high in front and the two ends, and about four feet at the back. These walls support glazed sashes on the four sides, those of the back being the highest—say six feet, the slope of the roof and side-lights being dependent upon those

of the front, which move upon hinges attached to the front plate, and are regulated by perforated iron stops that the gardener can fasten by a strong pin, and thus admit air to the desired extent. The pit is a yard or more deep; it is formed partly by the flue built of three bricks on edge. F is the furnace, sunk to the depth of three ordinary steps (marked STAIRS); *d* its door. The smoke passes through the first neck (IN) or entrance, courses in the direction of the darts, and passes to the chimney (*ch*) by the exit neck (OUT). To introduce and maintain an interchange of air without depressing the temperature of the house, the pit is enclosed by a tight deal board cover, so correctly fitted and supported as to confine all the air within the chamber, and to permit none of it to escape excepting through two openings (▭) about six inches square, raised above the level of the cover by four strips of wood, provided with flaps, which, one or both, can be opened to any width at pleasure. At the mark *a* is a deal trough brought level with the top of the end wall, that passes down into the ground; it is six inches in the clear, and below the surface of the earth is connected with a series of six-inch earthen pipes, which go through the base of the wall and enter the pit, conveying a stream of cool atmospheric air into the warm chamber. The opening of the tube *a* is furnished with a deal flap, that serves to admit or cut off the external air. The circle O at the extreme corner by the angle of the front and end walls, near the entrance door D, indicates an orifice sloping under the wall through a six-inch earthern tube, which joins a course of similar tubes by means of an elbow. These pipes gradually descend underground outside, near the foundation of the wall, till they enter the *ash-pit* of the furnace, thus completing the aërial circle. The ash-pit is provided with an air-tight door, which at kindling the fire is open, and so is left till the draught becomes so active as to produce a sensible heat throughout the flue; it can then be closed, and when so, the fire is supplied solely by the air which passes from the house through the circular orifice above described. The action, in every particular, as observed by me, was perfect, the heat very powerful, the draught complete, but both under command; and I may add that the entire erection could be converted into a forcing-stove, a grapery, a plant house, or simple green-house, at the option of the gardener. An internal zinc cistern, fed by an ingenious contrivance with the rain water of the roof, served to supply the plants with water, and the air of the house with moisture.

RETROSPECT.—The weather since our last has been remarkable for its extreme mutations. Slight frosts, frequent rains in small quantity, variable winds, and prodigiously rapid ascents and falls of the barometer, are noticed everywhere. The garden and field crops are, however, most promising; our market grounds are crowded with vegetable crops of the cabbage family. Potatoes are dear, but very good, and the dealers find no signs of progressive disease. This day (the last we register) is fine and sunny, after a frosty night; the wind west, but very chilly—rain follows.

Croydon, Feb. 21. J. TOWERS.

AGRICULTURAL QUERIES.

SIR,—I shall feel much obliged to any of your readers who can give me practical information on the following points in the cultivation of the common sainfoin, intended to stand for a succession of years on a good, dry, marly soil, capable of carrying excellent crops of wheat; but where, from the drought to which it is exposed, grass cannot be depended on; whilst its vicinity to a large demand for milk renders the growing green food for cattle during the summer season the most profitable occupation of the land:—

The best time for sowing?

The best mode of sowing—broadcast or drilling?

The smallest quantity of seed that could be safely used; in husk, or beaten out?

The price of seed at present time?

Your obedient servant,

Feb. 11. A SUBSCRIBER.

A correspondent inquires where he can procure a turnip cutter which does not cut, but scrapes.

A correspondent desires to be informed where he can obtain the best practical information on the soiling of cows.

A correspondent asks where he can procure, within the next six weeks, twenty-five genuine in-calf *Ayrshire* heifers, and a two-year-old bull of the same breed; and at what fair, market, or locality they may be bought most advantageously as to price.

PETERBOROUGH FARMERS' CLUB. — On Saturday se'nnight (the subject for discussion at this club being "The best mode of managing fallows, and the importance of root-crops") there was a good attendance; Mr. Turvill, of Sawtry, in the chair. On one point some difference of opinion existed on the best time of manuring land for turnips, Mr. Samuel Vergette, Mr. B. Johnson, and the larger part, seemed to think the spring was a preferable time for applying farm-yard manure; on the other hand, Mr. E. Leeds, Mr. W. E. Griffin, Mr. Allatt, and others, expressed themselves in favour of autumn. But as the meeting seemed to be united in favour of early ploughing the land, the question of manuring was postponed for special consideration on a future evening. The following resolution was then agreed to; viz.:—

"That the best plan of preparing fallows for a root crop is by skim-ploughing the land as soon as the grain crop is removed, by which it may be more thoroughly cleaned and the surface-weeds more easily destroyed. It is not recommended to plough land for turnips after April. The importance of root crops cannot be too highly estimated, as tending to the maintenance of an increasing quantity of live stock on farms generally, and consequently improving them by the manufacture of a greater quantity of valuable manure."

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR FEBRUARY.

The past month has well sustained its "fill dyke" reputation. During the greater portion of it the weather has proved seasonably fine, though somewhat large quantities of rain have fallen in most parts of England, and which have added to the farmers' difficulties in getting upon the land. At one period apprehensions were entertained that the winter wheats, from the mildness of the weather, had become too forward, and that the present year's produce would thereby be endangered. It is, however, gratifying to observe that, with some few exceptions, the plants are looking strong and healthy, without any such indication we have just noticed. As it is of the utmost importance for the agricultural body to become acquainted with the progress of affairs in other save their own localities, we have caused the most extensive inquiries to be made respecting the number of acres under wheat culture this season. The result of those inquiries enables us to state, with considerable confidence, that, if anything, it is in excess of some former years. It is very gratifying for us to be enabled to make this assertion, as it may tend to dispel many doubts on the subject, and give our readers an opportunity of forming their own conclusions for the future. That wheat is, generally speaking, the most valuable crop to the farmer, not a doubt can be entertained. On that ground we feel persuaded that a temporary fall in the quotations will not have the effect of lessening production to any great extent.

Notwithstanding the moist state of the land, farm labours, from the progress made in them during the month of January, are by no means backward, though, of course, much has yet to be accomplished ere spring seeding—for which every preparation will, we doubt not, be made in due time—can be proceeded with to any extent. Our accounts on the subject of the yield of wheat, as well as spring corn, vary considerably; yet we still incline to the opinion that the supplies of the former now on hand—looking to the fact that the transactions in it since the conclusion of the last harvest have been small, and this is obvious from the weekly returns—are by far more extensive than at the corresponding period in 1847.

The turnip crop has turned out much better than was expected; but many of the potato pits have been found sadly deficient in respect to sound qualities. In London, as also in the principal country markets and shipping ports, really good parcels have sold at very high prices; yet our letters from Ireland state that it is by no means improbable that we shall see as much land cultivated with that root this year as on any former occasion.

Stall-fed and other stock, both beasts and sheep, have fared remarkably well. The supply of food, dry and succulent, has been in extreme abundance —indeed, we seldom recollect a period when there has been so much hay on hand as at the present. This abundance has had the effect of keeping down the prices to a very low ebb. In London the best meadow-hay has sold at £3 15s. per load, while straw has produced with difficulty only from £1 4s. to £1 8s. per load. These rates render it scarcely worth while to send to market.

The early lambing season, under the influence of a mild temperature, has passed off remarkably well; and the fall of lambs has been a full average one, without any serious losses.

Although money has become more abundant, the rates of discount are easier, and the corn laws will again come into operation on the 1st of March, we have to report inactive markets for English and foreign wheats, and prices have suffered a further slight decline; yet it is quite evident the stocks held by the principal millers are smaller than usual. As to spring corn, this has been a mere drug, and the quotations have fallen more in proportion to the depression in those in wheat.

On the whole, the fat stock markets have been tolerably well, but not to say heavily, supplied with beasts, in the quality of which a great improvement has been noticed. The imports from abroad, owing to the closing of the navigation in Holland, have been trifling, and the beef trade must be considered steady at good prices, though several rather extensive fluctuations have taken place in them. Un-

usually small supplies of sheep have been brought forward. This deficiency has produced much activity in the mutton trade at improved quotations, which, it is considered, will rule high for some months to come, arising from the scarcity of sheep in some of our large flock districts. The losses sustained by the epidemic have been somewhat smaller than usual.

It is a matter of general remark that the offal of both beasts and sheep, more particularly the hides and skins, has sold at a much lower rate than in the ordinary run of years. We can attribute this fall in value only to the heaviness in the leather trade, and the large stocks now held by the various tanners. It is, however, by no means improbable, looking to the result of the public sales of wool in the metropolis, that prices will shortly improve, as it is quite evident that the quantity in the manufacturing districts is small for the time of year, and that large supplies are wanted to complete foreign and domestic orders.

In Ireland and Scotland fair average supplies of grain have been brought forward, and which have met a very inactive demand at drooping figures. The shipments of grain to England have been on a very moderate scale.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

One of the principal features connected with the trade in the past month must be considered the unusually small supplies of sheep on offer in Smithfield, as well as in the large country markets. We can only account for this fact from the comparative abundance of food in nearly, or quite, the whole of the large flock districts, and the additional length of time which many of the graziers are now keeping their stock at home. As might be expected, the mutton trade has been very active, at an advance in the quotations of from 2d. to 4d. per 8lbs., at which no difficulty has been experienced in effecting sales. The arrivals of beasts into London have been seasonably good as to number, and a great improvement has been noticed in their general quality. Some fluctuations have taken place in prices; yet, on the whole, they have ruled steady. Calves and pigs have sold at full currencies, though the demand has not been to say brisk.

Owing to the severity of the weather on the continent, in the month's early part, the imports of live stock from abroad have been small; but we understand that large supplies are now ready for shipment hither. Since our last, they have been as under:—

	Beasts.	Sheep.	Lambs.	Calves.
London	852	1167	14	103
Outports	340	1000	—	70
Total	1192	2167	14	173

At the corresponding period in 1847, they consisted of 960 head of beasts, 1,934 sheep, and 51 calves into the metropolis, and 1,260 head of each kind into Hull, &c., wholly from Holland.

Annexed is a comparative statement of the supplies of stock shown in Smithfield during the month of February, 1845, 1846, 1847, and 1848:—

	1845.	1846.	1847.	1848.
Beasts	18,379	13,140	15,101	15,404
Cows	527	590	601	570
Sheep	119,950	78,270	84,830	75,160
Calves	659	640	844	859
Pigs	2,159	2,031	2,285	1,935

The bullock supplies have been derived as under:—

	Head.
Eastern districts.....	4,200
Western, midland, and northern ditto..	4,800
Other parts of England	2,700
Scotland	610

From various parts of England, full average supplies of country-killed meat have come to hand; yet they have had very little effect upon value in Smithfield, as will be seen on reference to the following table of prices for the periods therein stated:—

Per 8lbs. to sink the offals.

	Feb. 1845.				Feb. 1846.			
	s.	d.	s.	d.	s.	d.	s.	d.
Beef ..... from	2	6 to	4	2	2	6 to	4	2
Mutton	2	8	4	4	3	6	5	6
Veal	4	0	5	4	4	2	5	4
Pork.....	3	0	4	4	3	10	5	2

	Feb. 1847.				Feb. 1848.			
	s.	d.	s.	d.	s.	d.	s.	d.
Beef ..... from	2	10 to	4	4	3	2 to	4	8
Mutton.....	3	6	5	0	3	6	5	6
Veal	4	2	5	4	4	2	5	4
Pork.....	3	6	5	0	3	10	5	2

At Newgate and Leadenhall prices have ruled thus: Beef from 3s. 2d. to 4s.; mutton, 3s. 8d. to 4s. 8d.; veal, 4s. 2d. to 5s. 4d.; and pork, 3s. 8d. to 5s. 2d. per 8lbs. by the carcass.

ESSEX.

The extraordinary mildness of the season is now covering our fields and pastures with all the appearance of spring; indeed we never remember the country presenting a more favourable aspect than it does this year. The young wheats are really beautiful, and full of plant as well as of growth. Both slug and wireworm seem entirely absent; and the past frost, instead of doing injury to them, has no doubt been of great service. Tares have also hitherto escaped injury from severity of weather, and pastures, more especially the fine

uplands, seem to have had no remission of growth. Sheep as well as oxen have fared remarkably well, and by a daily run on the pastures have hardly required the accustomed shelter of the farm-yard. Sheep have also been highly favoured by the mildness of the season, and the soundness of the turnip crop, as well as an abundance of hay; and a good fall of lambs is very generally spoken of. The season is now rather too wet for feeding on the land; but it is the prevailing custom to have a spare fold on a dry pasture, and in case of bad weather where to remove the flock, which, if supplied well with turnips, cabbages, and pollard, with a small separate supply of beanmeal for the lambs, do much better than on the turnip land. Bullocks have not suffered so much from the distemper this season as they did last, but probably were severe east winds to prevail in the spring months, it may again return. The price of beef is now receding, and should it go but a trifle lower, great losses must occur to the grazier, as the lean stock was bought in very high. Mutton rules high in the market, but there is not much in the country, farmers generally having been very sparingly stocked since the passing of Peel's tariff. Potatoes have suffered very severely in clamp, and in many cases have all perished; but the price has by no means been high, as their substitutes—cabbages, turnips, carrots, and parsnips — have been more than usually abundant. The poor this season have found very fair employment, and must have benefited by the mildness of the season, both as regards food and firing; but we exceedingly regret the poor-rates have been very heavy, indeed more so than that of the latter part of the year 1846 and early part of the year 1847. Why that should be the case we cannot conceive, as labour has been very abundant, and food so much cheaper: this circumstance, joined with the great and increasing demands on the farmer in the shape of other taxes, compel him to retrench many of the comforts to which his station and capital ought to entitle him. We have to report the beginning of spring seeding, some peas and beans being already put in, though the land has not worked in so good order as we could have wished. Great expedition will no doubt be made when the land gets dry, as most of the manuring and ploughing intended for spring cropping has been completed under the most favourable circumstances. We consider our stackyards as being as well furnished with cornstacks, as also of hay, as is usual at this time of year; indeed far better than this time last year. Where it has been possible to hold, we believe the farmer has done so under the idea some extra demand might again arise from the failure of the potato; but the substitutes for that root, which have hitherto been so plentifully used, have rendered the policy of their so doing extremely doubtful. The yield of the different descriptions of grain has been generally good, except beans and peas, which have been barely half a crop. Clover-seed has hardly paid the expenses of the barn, and in some cases will probably not be thrashed at all, as the foreign supply prevents the English growth incurring any extra expense in getting out. The prices wheat has fetched have been about remunerative, but for all other grain it has ruled too low. The improved state of the money market will probably induce speculation in foreign markets, and a large supply of foreign corn be the result.—Feb. 16.

NORTH NORTHUMBERLAND.

At the commencement of the new year, farm labour in every department was in a very forward state. Up to the 18th January we experienced no frost to prevent the plough from working, although the mountainous districts had been for a few days previous covered with a winterly mantle. A keen frost then set in, which continued with little abatement until the end of the month. Snow fell at intervals, but the land was never covered to any depth to obstruct travelling; on all sides we could see the busy team at work carting out manure. The frosty atmosphere had also a tendency to check influenza and fever, which had been very prevalent over the entire district; but February was ushered in with a change—rain, wind, and rain, have so far prevailed that it is only on the driest soils any field labour can be followed up without the risk of potching. We consider this period of the year about the most suitable for sowing spring wheat, if a season offers; but so far, nothing has or can be done. Land of every description is so completely saturated with moisture, that it will require a few days of fine weather before seed can be safely committed to the soil. We always adopt the maxim, "There will be a sowing time before a growing time;" and at this early season of the year, seed ought never to be committed to the ground unless the land be dry, and in fine working tilth. To-day the elements assume a stormy aspect, wind from N.N.W., with heavy blasts of sleety snow. On all high situations it lies white, but near the sea coast melts as it falls, which makes fields, roads, and thoroughfares, all alike in a puddle of mud. Thrashing has progressed to an unlimited extent since our last; as it requires a daily littering to keep the fold-yard comfortable for the cattle, in such weather as we have experienced lately, the *stall-feeder* has the fullest advantage over the old system. The animal is always dry and clean, if under a master's eye, and properly attended to. The system (stall-feeding) is yet in its infancy in this northern county, but will, we hope, be more generally adopted when more generally known; so far, we only know of two or three *proprietors* who have, in a praiseworthy manner, set the example; and having been lately very kindly treated by a gentleman to examine his herd of stall-feeders (oxen and heifers), hesitate not to say great praise is due to those who have set the example; and for which, hope the experiment will pay fourfold. Except under very long leases, it cannot be expected that the tenant farmer will be at the cost of the necessary erection of buildings; and, unless it can be instilled into the minds of the owners of estates to be at the first cost, we may wait like "hope deferred," which "maketh the heart sick," before we see a general system of stall-feeding adopted in this fine turnip-growing district. We are fully alive to the utility of the plan in furthering the early maturity of the animal for the shambles, and more so in the economy of food. We cannot close our remarks without recording heart-

felt thanks to the spirited individuals who, for their own benefit and more for the general intelligence of the county, have introduced stall-feeding into North Northumberland. Although the weather has not been favourable for the wheat plant latterly, we see nothing, so far, to complain of; it keeps a good colour. But it is too early in the season to form any opinion as to the future; and should the present unsettled weather continue many days, a large breadth of land, intended for spring sowing with wheat, must necessarily be seeded with barley or oats. Markets have been nearly stationary for some time past. Whatever may be the result, or from whence the supplies may be drawn to supply our large consumption until next harvest, time must try; but certain it is, the last year's produce has been liberally thrashed out and brought to market; yet our corn returns show a great falling off, compared with former years. This confirms our *experimental* opinion, that at the end of the season the yield generally will be found to fall far short of our usual quantity. Turnips have fed well so far; on some situations the frost has injured the bulb, but generally they seem to be safe and plentiful. We may therefore look forward to a good supply of fat bullocks for our May markets.—Feb. 16.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

ASHBOURN FAIR was well supplied with an average amount of cattle, and prices of things of a good quality have been maintained.

BATH FAIR. — Beast in good condition; Devon and Hereford stocks fetched good remunerating prices; the inferior did not find so ready a sale. A good number of Welsh oxen went off very well. Large oxen sold at from £10 to £13 per head; small, £5 to £8. Some excellent cows and heifers in-calf, went at from £13 to £17 each. Cow and calf, £10 to £16. Fat stock was not so plentiful; those brought sold fully as high; best making 11s. to 12s. per score; second quality, 10s. 6d.; inferior, 9s. to 10s.

BEACONSFIELD FAIR was well supplied with both fat and store sheep. There was a good trade in them. Horses were dull sale, except first-class ones, which made high prices.

BEDALE FAIR.—The demand for beef was very brisk; consequently prices went up a shade, though nothing quotable. The mutton trade was as the last two or three fairs, with a good clearance. Lean stock slow of sale; in-calving cows were easier to buy. Upon the whole, there was a good business done, and few things returned unsold. Beef, 6s. to 7s. per st.; Mutton, 6d. to 7d. per lb.

BINGHAM HORSE FAIR.—There was a limited supply, which fetched exceeding high prices. Two and three years old colts were much inquired for, and the supply unequal to the demand.

BRIDGNORTH FAIR was well attended, and a good deal of business was done. Good stock sold at better prices, sheep readily fetching 7½d., and good ewes as much as 7½d. per lb. Good fat cattle were in demand, but scarce; what were present readily found customers at 6d. to 6½d. per lb. Cows and calves fetched from ten to fourteen guineas, according to quality. In-calving cows sold well, and at advanced prices from last fair. Horses were plentiful, but mostly of inferior quality, and sold at average prices. The supply of good family cheese was small, and was readily sold at 5d. per lb.

CASTLE-DOUGLAS FAIR.—Neither the show of horses nor the attendance of dealers was large. The prices of first class animals were from 35*l.* to 45*l.*, second class from 25*l.* to 35*l.*, and this description sold well. There was less demand, at corresponding prices, for inferior animals, but almost all were sold.

CARLISLE HORSE FAIR was exceedingly well attended by both buyers and sellers, and a great deal of business was transacted. Useful and good draught horses sold at from 20 to 40 guineas each; few, however, reaching the latter sum. Of harness horses there was but a moderate show, and not first-rate. All good horses met with ready purchasers at prices which equalled the expectations of most sellers.

DEVIZES FAIR was larger than usual. Owing to the high prices asked, the trade was, however, generally speaking, dull, with the exception of poor oxen, of which there was an unusually short supply. Graziers brought from £10 to £14, and in some instances more; and best beef sold at from 10s. 11s. 6d. the score.

DORCHESTER FAIR.—Owing to the inclemency of the weather, the attendance was not so numerous as we have witnessed on former occasions. There was a good show of stock, and of excellent quality; the horse fair, however, did not exhibit a show equal to that of former years, but good cart horses fetched high prices, some realizing as much as £40. Cows and calves sold from £10 to £14 each; barreners, of which there was a large number, from £7 to £10 each; of fat stock there was but an indifferent show, and prices ranged from 10s. to 12s. per score. In fact, business through the day was unusually dull.

DUMFRIES FAIR.—There was a good attendance of people in the town, but not so many as we have often seen. The show of horses was a fair one in point of numbers, and there were many both for draught and the road of a superior order. Prices for first-rate animals were about last year's rates, and they sold readily; but the demand for middling and inferior ones was rather slack. The prices for good working horses ranged from 30*l.* to 50*l.*

EAST LOOE FAIR was well supplied with cattle. Fat bullocks fetched from 55s. to 60s. per cwt.; fat sheep sold at 7d. per lb.

EXETER FAIR.—There have been purchasers from the principal counties from Norfolk to Cornwall. The show of oxen has not only been large, but scarcely to be surpassed; and so also of the best description of steers. Although all has not been sold, yet has there been a large stroke of business done. One agriculturist from the west drove in 40 oxen and steers. From the farm of Samuel Brown, Esq., of Crediton, there were driven in 14 steers, which were all bought by a dealer from the upper counties, at about £31 the pair, or £15 10s. a piece. Mr. Wm. Smith, of Drewsteignton, drove in 20 store heifers, of which 12, estimated to graze 34 score the bullock, were at once taken in a lot, at a sovereign to luck out of £11 a piece, or nearly 37s. 6d. per cwt., or nearly 6s. 6d. per score. A dealer from the eastern counties bought 14 superb store oxen, at upwards of £40 the pair. We quote store oxen at from £28 to 40 guineas the pair. The best ordered description of Steers, at from £22 to £31 the pair. Small size and poor steers, at from £16 to £20 the pair. Store heifers at from £8 to £11 a piece, or from 34s. to 37s. 6d. per cwt., or from 6s. to 6s. 6d. per score.

FARINGDON FAIR was but thinly attended by dealers; there were but few horses and cattle, and those brought were of an inferior description.

GISBURNE FAIR.—We had only a short supply of fat beasts and not many buyers, which caused a dull sale; prices about the same as last fair. We had a reasonable quantity of present calvers, which were bad to sell; prices lower.

HILLSBOROUGH (IRELAND) FAIR.—Of highly finished fat stock the number shown was very small, and prices demanded high, as compared with the value at November. In-

ferior stock was also in better demand, and brought fair prices. Springers, young and good-sized, ranged at prices from £13 to £10., and the next quality £10 to £8. Half-fat cows, for the stall, were particularly sought after, and, from the abundance of keep, realized high rates. Milk cows, except of fine appearance, were dull of sale, and little business done in them. Sheep, in prime condition, were scarce, and sold readily, at a trifling improvement on late prices. A great many store pigs appeared on sale, and those disposed of went off at rates from 25s. to 40s. The horse fair was not large, the chief demand being for farming purposes. These sold from £15 to £20; and a good number of that description changed hands. Roadsters were not much inquired after. There were a few superior saddle horses, for one of which the owner demanded sixty guineas, but the animal remained unsold. On the whole, though the fair, in point of attendance, was not equal to the last quarterly one, there seemed to be a better demand for cattle of the higher description, and more remunerative prices were obtained.

KELSO MONTHLY MARKET.—The show of cattle, though larger than that of the preceding month, was scarcely so great as was expected, and consisted principally of fat beasts of excellent quality. There was a very good attendance of buyers, and though the prices at Newcastle market on Tuesday last were rather lower than those of the previous week, still the prices obtained on Thursday were fully equal to those of our last monthly market, and nearly the whole disposed of, only a few of the holders declining to accept of the terms offered. Fat cattle brought from 6s. 6d. to 7s. per stone sinking the offal. Keeping and young beasts were in request, year-olds bringing from £5 to £7, and two-year-olds from £8 to £9. There was a fair supply of cows, and those of good quality met with purchasers. Country cows brought from £8 to £12, and those fit for the Edinburgh market were selling at from £14 to £18. There was a good supply of sheep, which sold readily, and all cleared off; prices from 6½d. to 7d. per lb. Number of fat cattle in the market, 174; keeping cattle, 41; young beasts, 19; cows, 37; sheep, 340.

KENDAL FORTNIGHTLY FAIR.—The prices were rather lower than the previous fair, but buyers were very backward, and not much business was done.

LEEDS FORTNIGHT FAIR.—There was an average number in the supply of stock, some of which was of very inferior quality, and there being a good attendance of buyers the whole was sold up. Beef, best quality, 6d.; inferior, 5¾d. per lb.; Mutton, 6¾d. to 7d. per lb. Beasts, 380; Sheep, 2,500.

LINCOLN FORTNIGHTLY MARKET.—There was an advance in the prices of stock. Mutton, ewe, 6½d. to 7d.; wethers, 7½d. per lb. Beef, 7s. 6d. to 8s. per stone. There was a very good supply, and a many buyers.

LOUGHBOROUGH FAIR was very thinly attended, but some very useful animals were shown, and realized good prices. Scarcely any good horses were shown.

LUDLOW FAIR was exceedingly small, and little was done in the pig trade. Fat ewes fetched 6d. and wethers 6½d. per lb. Very little stock was shown. Fat stock realized from 6½d. to 7d. per lb. The horse fair scarcely deserved the name; a few inferior horses were shewn, and little business was done.

NEWTON-STEWART HORSE FAIR.—The show of horses was indifferent. A few good horses were exposed, for which prices varying from £35 to £50 were asked; but the greater part remained unsold. Sellers could not make up their minds to accept the reduced prices dealers offered. A pair of two-year-old draught horses were shown, for which the owner asked £100, but we understand he never got a bid. Prices, on the whole, are decidedly lower than they were at Martinmas.

NORTHALLERTON GREAT HORSE FAIR was attended by a great number of respectable gentlemen and dealers from most parts of the kingdom; also cavalry officers, and a few foreigners. Real good horses, on Monday and Tuesday, sold at high prices, but on Wednesday and Thursday the sales were not so brisk, and horses which were sold on these days did not realize the prices which their owners had expected; but on Friday morning a reaction took place, and the dealers become more anxious to make purchases, when a brisk sale commenced, and continued throughout that day and part of Saturday, and many good horses were disposed of. Prime draught horses were in demand and sold well, prices ruling from £30 to £50. There was a great show of cattle; fat beasts sold at from 6s. 9d. to 7s. 3d. per stone, and all sold up. The show of in-calvers was a very indifferent one, and met with a poor sale; for other kinds and young stock there was a good demand, and many sold to drive to the south.

PENRITH FORTNIGHT FAIR.—There was only a poor show of Sheep, but there was a considerable number of Beasts for sale, which were generally very poor in condition. A tolerable number of sales were effected at prices a small fraction on the decline, the Sheep fetching about 6d. per lb., sinking the offal.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF FEBRUARY.

Very little change has taken place in the position of the grain trade since we had last the pleasure of addressing our readers; indeed so entirely uninteresting have been the operations as to afford but a scanty field for remark. The view we then took of the probable tendency of prices has, however, been fully borne out, and those parties who reckoned on an advance have been disappointed. The fluctuation in the value of wheat has not, it is true, been very important, but there has been so great a want of confidence in quotations being long maintained as to occasion more disposition to realize and less to purchase; hence the buyers have had the turn in their favour at most of the leading markets in the kingdom. The causes of the continued depression are, in our opinion, the prostration of credits, the diminished amount of capital employed in this branch of commerce, and the suspicion with which business in corn is looked upon, since the fearful disasters of last year, by those not immediately engaged in the trade. As an article for investment grain is likely to be neglected until its value shall have been reduced to such a point as capitalists may deem safe; and this point has not yet, we think, been attained. How low wheat may go will in a great measure depend on the character of the weather during the spring and summer; if nothing should occur to give rise to uneasiness in regard to the next crop, a rather important fall might yet take place, moderate as prices now are. We know that this opinion cannot be very palatable to our agricultural friends, but it is given after mature consideration, and with a full belief in its correctness; we wish our readers, how-

ever, to draw their own conclusions; we shall state the reasons why we entertain this view of the matter. In the first place it will, we think, be admitted that the last crop of wheat in this country was a full average, and that barley and oats were more productive than in ordinary years; potatoes would also seem to have turned out much better than was at first expected: so that, on the whole, there was no deficiency in the amount of human food grown in these islands. On the continent of Europe, and in America, the case was the same; indeed in many of the principal corn-growing countries a considerable surplus would appear to have been produced, a greal portion of which is sure sooner or later to find its way into the British markets. Meanwhile we are not without stocks of foreign wheat, some part of the immense supplies which poured in during last summer still remaining in granary. Such being the case, is it likely that the value of wheat can advance? In the northern countries of Europe, where the masses subsist principally on rye, the last crop of wheat has scarcely yet been touched. Our own farmers have, we are inclined to think, more than usual remaining on hand, in consequence of the consumption having been in a measure thrown on foreign. The bad condition in which the new English has till now come to hand has rendered a large admixture of old necessary; for this purpose the best kinds of foreign have been employed, and what now remains of the latter is mostly the inferior sorts. To get rid of these will not be an easy matter, particularly as the Irish demand for meal has almost wholly subsided. Our position as to stocks appears to us to be this—of old English wheat little or none remaining on hand; of new more than at the corresponding period in ordinary seasons, and probably enough to carry us into harvest without assistance from abroad; the stock of old foreign, though not large in quantity, is of too inferior a quality to be readily disposed of, and the prospect of importations on rather an extensive scale during the ensuing summer. Under these circumstances we should not be surprised to see the average price of wheat 5s. per qr. lower than it is at present, if the growing crops should progress favourably. The general character of the season has hitherto been auspicious: the winter was perhaps rather too mild; still there was sufficient frost to check premature luxuriance. Latterly we have had a good deal of rain, but not more than is considered advantageous in the month of February. We hear of no complaints respecting the autumn-sown wheat—on the contrary, the reports mostly describe its appearance as promising; and there is, consequently, nothing in the present state of affairs to encourage speculation. Many parties, nevertheless, still expect a rise, and ground their expectations on the reimposition of the duties which is to take place on the 1st of March, and the probability of the deliveries from our growers falling off so soon as farmers shall have commenced the preparation of the land for spring sowing. It must, however, be recollected that the highest duty chargeable on wheat under the last law is only 10s., and the lowest 4s. per qr. With a favourable prospect for the next harvest at home and abroad, 10s. per qr. would not stop importations, though it might in some measure act as a check.

Already prices are falling at the leading Baltic ports; and the value of wheat is now nearly as much lower on the continent as the duty likely to prevail next month. Past experience has proved that the duty is not paid by the consumer in this country; but by the foreign producer. No sooner is it taken off here than prices rise abroad; and *vice versâ*. Contracts might at present be entered into for the purchase of capital 61 to 62 lbs. wheat, to be shipped at first open water from Lower Baltic ports, at 40s. to 42s. per qr.; and if our merchants continue to act on the reserve, we have no doubt prices will continue to recede on the other side. Freights are also coming down; and whether we may require foreign aid or not, shipments are sure to be made to this country, not only from the north of Europe, but likewise from America.

We shall now proceed to give a more detailed account of the occurrences at Mark Lane during the month: for uninteresting as these have unquestionably been, still our review would not be complete were we to omit the doings at the metropolitan market. The tendency of prices was, it will be recollected, downwards towards the latter part of January, and February commenced under much the same auspices; but the very scanty character of the supply of English wheat, and the fact that the leading town millers held no stocks of any importance, prevented any further decline taking place in prices. The moderate quantity brought forward on Monday, the 7th inst., was cleared off, though by no means rapidly, at similar terms to those previously current; and scarcely any quotable alteration has since occurred. Rather less money may, in some cases, have been accepted; but then the quality has been as much inferior as the difference in price. Good runs of red Essex and Kent wheat were not worth more than 52s. to 53s. per qr., and the finest white, 57s. to 58s. per qr. in the commencement of the month; nor could purchases of really dry parcels be made at present below the rates named; prices may, therefore, be regarded as having remained nearly stationary. Latterly the supply has slightly increased, but there is no accumulation of English wheat at this port, the quan-

tity hitherto received having only about kept pace with the consumptive demand.

The transactions in foreign wheat have throughout the month been on quite a retail scale; very few country purchasers having visited our market, and the buyers for local use having confined their operations to as narrow limits as consistent with their pressing wants. The finer descriptions have, nevertheless, been held with considerable firmness, owing to the narrow compass into which the stock of really good wheat has been reduced. The best Danzig (of choice high-mixed we have none left) has from time to time been taken in small quantities, for mixing with the damp parcels of English, at 56s. to 58s. per qr.; and for a cargo of Rostock 56s. to 58s. per qr. has been realized.

The recent receipts of new wheat from some of the near continental ports have also brought full terms. Several lots shipped from Cuxhaven have sold at 50s. to 53s. per qr. (weight, per bushel, varying from 60 to 62 lbs.); and for a cargo or two of red received from Antwerp, not weighing more than 60 to 60½ lbs., about 50s. per qr. has been the selling price. The ordinary kinds ex granary have, meanwhile, been almost wholly neglected; being unsuitable for London use, and no longer wanted for the north or for Ireland. Inferior Russian wheat has been freely offered at 40s.; common Odessa at about 42s. to 45s.; and the best Polish Odessa at 45s. to 48s. per qr., without exciting attention. There are other sorts in granary still lower, consisting of Danube, Egyptian, &c.; of which quotations can scarcely be given: some of the worst descriptions might certainly be purchased at 30s. to 35s. per qr.

With so little fluctuation as that above described in the value of wheat, there has been little need of altering quotations of flour; the top price has, however, been lowered 2s. by the town millers—46s. per sack being the highest. The arrivals of the article coastwise have not been large; but we have received a fair quantity from Norfolk, per rail, and country marks have receded in price quite as much as town-manufactured flour. The scarcity of really fine qualities of American has caused the best fresh parcels to be held at nearly former terms, say 27s. to 27s. 6d. per brl. Doubtful brands have been sold at irregular rates; viz., from 23s. up to 26s. per brl. The arrivals from the United States at this port have been quite trifling, but at Liverpool some quantity has lately been received from thence; and prices have receded there from 30s., which the article was worth at the end of January, to 28s. per brl.

Barley of home growth has come to hand rather freely, particularly towards the close of the month; and the maltsters and distillers having previously got pretty well into stock, former terms have not been supported. The total decline, since our last, has amounted to quite 2s. per qr.; the best malting sorts, which were then saleable at 35s., having lately been offered at 33s. per qr.; and other descriptions at proportionate rates. Within the last ten days we have had moderate arrivals from abroad, and as some quantity was bought in the Baltic during the winter, for spring shipment on British account, we may expect further supplies a month or two hence; any rally in prices does not, therefore, appear very probable. Egyptian barley is not saleable, at present, much over 20s. per qr.; but good heavy grinding sorts, from the north of Europe, are still worth 26s. to 28s. per qr. Malt has, as usual, been influenced by the state of the barley trade, and its value has, on the whole, receded. The brewers are, we believe, tolerably well in stock, and they have recently shown no disposition to add further to the same. In the present state of the revenue and expenditure of the kingdom, there is no prospect of any concession being made in the malt duties, and the matter has for some time engaged less attention than previously.

During the first half of the month the market was indifferently supplied with oats, and though the receipts have since increased, they have not been particularly large; it is, however, the prevailing opinion that rather an important quantity is now on passage from the near continental ports, shipped under the impression that the vessels would have made the voyage in time to arrive here before the duty was re-levied. The belief that good supplies of foreign are near at hand has had a very depressing effect on the trade, and prices have, within the last fortnight, receded materially—certainly not less than 2s. 6d. per qr. Capital Scotch feed have lately been sold from on board ship at 23s. to 24s., very good Irish at 21s. to 22s., and other kinds at corresponding terms. That the consumption of oats must have been much less than usual during the winter can scarcely be doubted; for, though we have been almost without arrivals from Ireland, nothing like scarcity has at any period been felt. This has, no doubt, been partly caused by the extreme mildness of the winter, and partly by the use of substitutes—the prices of Indian corn, rye meal, and other articles suitable for cattle feeding, having been comparatively low.

The arrivals of English beans have been tolerably large; and the inquiry having been excessively slow, the value of the article has gradually receded. New stocks are now not worth more than 34s. to 36s., and handsome small beans 40s. per qr. Old beans having become very scarce, have commanded relatively high terms. The arrivals of this

article from Egypt have been more plentiful than calculated on, and, as not the slightest disposition has been manifested to speculate, it has been necessary to accept low prices to effect sales from on board ship, and 27s. to 28s. per qr. may be considered about the current value.

The inquiry for white boiling peas has been very slow, and similar qualities to those sold at the end of January at 45s. have lately been offered at 42s. per qr. Maple peas have, on the other hand, been in good request for sowing; and prime parcels were at one period sold as high as 45s., but have since receded about 1s. per qr. from that point.

Since the demand for Indian corn on Irish account has subsided, very little business has been done in the article either here or at Liverpool; and prices have remained nearly stationary. The best parcels have been held at 31s. to 32s. per qr.; but to have sold the inferior sorts it would have been necessary to accept much lower prices. Large supplies of this article will, no doubt, reach us during the summer months from the United States, and by the latest accounts from New York it appears that some quantity had been bought on British account at prices varying from 68 to 70 cents per bushel—(25s. to 26s. per qr).

Before concluding our remarks, we beg to lay before our readers the substance of the most recent advices from our foreign correspondents: by these it appears that a considerable change has taken place in the position of the grain trade abroad; and the inactivity which prevailed during the winter months has been followed by active preparation for the spring trade. The contracts actually entered into have not, it is true, been of much importance; but the foreign merchants have shown a disposition to facilitate business by lowering their pretensions, though as yet the supplies brought forward by the growers have not been large. The most recent advices from Dantzic inform us that the weather had for some time been mild, and that an early re-opening of the navigation was expected. The stock of really good wheat in granary at that port appears to have been reduced into a very narrow compass, and shipments on an extensive scale would therefore hardly be practicable until receipts should have come down the Vistula. The tendency of prices had, nevertheless, been decidedly downwards; and fair qualities of new mixed wheat were then procurable at equal to 41s. to 42s. per qr. free on board at first open water. Superior old high-mixed samples were comparatively dear, there being no sellers of the latter below 48s. per qr.

The accounts from most of the lower ports also speak of the want of stocks, and the scanty manner in which the growers had brought forward their wheat all through the winter. The fact is, that the foreign farmers have for some years become accustomed to receive high prices for their produce, which has rendered them well off in a pecuniary point of view, and they are consequently the less inclined to sell freely at the present moderate rates. We are inclined to think, however, that when they find British buyers do not appear, they will have to accommodate themselves to circumstances; but there does not seem much reason to expect any overwhelming supplies from the Baltic in the first instance. At Rostock, Stettin, and neighbouring ports, prices had receded to 40s. to 42s. for good, and 43s. to 44s. per qr. for the very finest qualities of wheat, and only a moderate export demand had been experienced at these rates. At some of the Danish and Holstein ports, where the quality is not so fine, fair parcels might be secured at 38s. to 40s. per qr. free on board at first open water. The latest reports from Hamburg inform us that the Elbe was free from ice up to that city, and that business had in some measure revived from the previous inactivity; it had, however, been necessary to submit to lower prices to effect sales of wheat, and the very best Upland qualities were not then worth more than 46s., whilst capital samples, weighing 62lbs. per bushel, had been sold at 44s. per qr. The Maas and the Scheldt have been some time open; but beyond a few parcels of wheat despatched from Antwerp, with a view of being cleared in here previous to the duty coming into operation, no shipments have been made either from Dutch or Belgian ports. In the southern countries of Europe prices of wheat have for some time been, and are still, much too high to render it probable that shipments will be made from thence to this country; and the few cargoes which have during the last month or two arrived from countries lying east of Gibraltar have been in fulfilment of contracts entered into long ago, when affairs wore a very different aspect here. The most recent letters from Marseilles quote good Polish Odessa wheat at that port 46s. to 48s. per qr., being fully its present value in our market.

The advices from America are up to the end of January. The business done in flour does not appear to have been very extensive, and its value had rather receded; still good brands of western had not been sold at New York below 6 dollars (about 27s.) per brl.; and all that is now arriving at our ports must, if sold at current rates, leave a heavy loss to the importers. That prices will go down on the other side of the Atlantic we regard as nearly certain, the last crop of both wheat and Indian corn having been unusually productive all over the United States and in Canada: sooner or later we may, therefore, expect larger arrivals from that quarter.

CURRENCY PER IMPERIAL MEASURE.

FEBRUARY 21.

	Shillings per Quarter. NEW.		OLD.	
WHEAT, Essex and Kent, white	48	to 56	50	to 58
Ditto red	45	52	48	54
Norfolk and Suffolk	45	48	—	—
Lincolnshire and Yorkshire	—	—	48	52
RYE	32	34	—	—
BARLEY .. Essex, Kent, Norfolk, and Suffolk .. com. Malting	30	32	—	—
Distillers' & Grinding	27	30	—	—
Chevalier	31	33	—	—
MALT .. Essex, Norfolk and Suffolk	—	—	54	56
Kingston, Ware, and town made	—	—	56	58
OATS .. Norfolk, Cambridgeshire, Lincolnshire, and Yorkshire, feed	—	—	19	21
Ditto, Poland and potato	—	—	23	25
Northumb., Berwick, & Scotch potato	—	—	25	27
Ditto, feed	—	—	23	25
Devon & West Country, feed or black	—	—	16	19
Dundalk, Newry, and Belfast, potato	—	—	22	23
Ditto, feed	—	—	20	22
Limerick, Sligo, and Westport, potato	—	—	21	23
Ditto, feed	—	—	20	22
Cork, Waterford, Dublin, Youghal, and Clonmel, black	—	—	16	19
Ditto, white	—	—	18	21
Galway	—	—	13	15
BEANS .. Ticks	34	36	45	50
Harrow and small	38	40	45	55
PEAS .. Boiling	40	42	—	—
Hog and grey	38	43	—	—
FLOUR .. Town made (per sack of 280 lbs.)	—	—	41	46
Norfolk and Suffolk, household (do.)	—	—	35	38

FOREIGN GRAIN.

	Shillings per Quarter. FREE.	
WHEAT .. Dantzic and Konigsberg, finest high mixed white	54	to 58
Ditto, good mixed	53	54
Ditto, red mixed	48	50
Stettin and Rostock	54	56
Danish	48	52
Hamburgh and Pomeranian	50	55
Black Sea (nominal) hard to soft	40	45
Riga, St. Petersburgh, and Liebau, soft	40	43
INDIAN CORN	25	32
BARLEY .. Hamburgh, Dantzic, Konigsberg, and Riga	28	30
Ditto, Grinding	25	28
Danish, Mecklenberg, and Pomeranian	24	28
OATS .. Dutch, brew, & Poland, Friesland, & Groningen	23	25
Danish and Swedish	18	21
Russian	19	22
BEANS .. Tick	36	40
Small	42	45
Mediterranean	27	28
PEAS .. White boiling	40	42
FLOUR .. United States	23	27
Canadian	22	26
INDIAN CORN MEAL (per brl. of 196 lbs.)	14s.	to 14s. 6d.
RYE FLOUR (per ton)	£6 10s.	to £6 15s.

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans. s.	d.	Peas. s.	d.
Jan. 8, 1848..	53	10	31	7	20	11	31	4	40	8	46	0
Jan. 15, 1848..	53	5	30	6	21	0	29	2	39	1	46	4
Jan. 22, 1848..	53	1	30	4	21	1	30	8	38	8	45	2
Jan. 29, 1848..	52	0	30	8	21	3	30	6	38	7	43	5
Feb. 5, 1848..	51	2	30	9	20	7	32	6	38	5	42	9
Feb. 12, 1848..	51	0	31	2	20	7	30	5	38	1	43	2
Aggregate Average of the six weeks which regulates duty	52	5	30	10	20	11	30	9	38	11	44	0
Comparative Average same time last year	71	10	52	0	31	1	52	8	51	4	54	11

PRICES OF SEEDS.

FEBRUARY 21.

There was rather more inquiry for both white and red cloverseed, but prices were not higher. Canaryseed was in lively request, and advanced 3s. to 5s. per qr. Tares brought quite as much money. Crushing Seeds and Cakes remained dull. In other articles there was little passing.

BRITISH SEEDS.

Cloverseed, red 38s. to 54s.; fine, 55s. to 56s.; white, 46s. to 56s.
Cow Grass ..... 38s. to 63s.
Linseed (per qr.).. sowing 56s. to 60s.; crushing 44s. to 48s.
Linseed Cakes (per 1,000 of 3 lbs. each) £13 10s. to £13 15s.
Trefoil (per cwt.) ..... 15s. to 21s.
Rapeseed, new (per last) ..... £28 to £31
Ditto Cake (per ton) ..... £5 15s. to £6
Mustard (per bushel) white .... 6s. to 9s.; brown, 8s. to 10s.
Canary (per qr.) ..... 68s. to 70s.; fine, 72s. to 73s.
Tares, Spring, per bush. ..... 5s. 6d. to 6s. 6d.

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. ..... 40s. to 50s.
Ditto, white (duty 5s. per cwt.) per cwt. ..... 40s. to 60s.
Linseed (per qr.) .. Baltic 44s. to 48s.; Odessa, 45s. to 50s.
Linseed Cake (per ton) ..... £8 to £9
Rape Cake (per ton) ..... £5 to £5 10s.
Carraway (per cwt.) ..... 35s. to 37s.; new, 37s. to 38s.
Coriander (per cwt.) ..... 18s. to 21s.
Hempseed (per qr.) ..... 35s. to 38s.

HOP MARKET.

BOROUGH, Feb. 21.

The better descriptions of Hops have a limited inquiry, at about last week's currency; other sorts are heavy, and a shade in favour of the buyer. Sussex pockets, 62s. to 67s.; Weald of Kents, 65s. to 70s.; Middle and East Kents, 66s. to 112s.

POTATO MARKET.

SOUTHWARK WATERSIDE, FEB. 21.

The arrivals this week both by rail and coastwise bespeak a much larger supply of Potatoes in the country than was supposed to be the case. The demand has been very limited, and in every sample less prices have been submitted to; inferior samples are unsaleable. The following are the present quotations :—

	s.	s.		s.	s.
York Regents	120	to 160	Kent and Essex Regents	120	to 150
Do. Shaws	130	to 140	Kent & Essex Shaws	120	to 130
Wisbech Regents ..	110	to 130	Do. Kidneys	130	to 150
Do. Blues	100	to 120	Do. Blues	110	to 120
Do. Kidneys	110	to 130			

BUTTER, CHEESE, BACON, AND HAMS.

Butter, per cwt.	s.	s.	Cheese, per cwt.	s.	s.
Dorset	108	to 112	Double Gloucester	60	to 64
Carlow	94	98	Single	58	64
Sligo	86	88	Cheshire	56	70
Cork, 1st	88	94	Derby	62	66
Waterford	88	89	American	40	48
Limerick	86	90	Edam and Gouda	46	50
Foreign, prime			Bacon, new	64	—
Friesland	106	—	Middle	46	60
Kiel	94	102	Hams, Irish	66	70
Fresh Butter, per doz., 12s. 6d. to 15s. 0d.			Westmoreland ..	84	—
			York	84	—

HIDE AND SKIN MARKETS.

			s.	d.		s.	d.	
Market Hides,	56 to	64lbs.......	0	1½	to	0	1¾	per lb.
Do.	64	72lbs.......	0	2		0	2½	,,
Do.	72	80lbs.......	0	2¾		0	3	,,
Do.	80	88lbs.......	0	3		0	3¼	..
Do.	88	96lbs.......	0	3¼		0	3½	,,
Do.	96	104lbs.......	0	3½		0	0	,,
Calf Skins			4	6		6	0	each.
Horse Hides			8	6		0	0	,,
Polled sheep........................			3	6		4	7	,,
Kents and Halfbreds..............			2	9		3	6	,,
Downs........................			2	8		3	3	,,

BARK.

Per load of 45 cwt.

English, Tree..............	£11	0	0	to	£12	0	0
Coppice..................	12	0	0		13	0	0

LIVERPOOL (DUTY FREE)—Quercitron, 8*l*.6s. to 9*l*. 6s.; Dutch Oak, per ton, 4*l*. to 5*l*.; German, 3*l*. 10s. to 6*l*.

TIMBER.

	£	s.	d.		£	s.	d.
Baltic Timber, per load of 50 cubic feet..	3	10	0	to	4	5	0
Yw. Deals, per standard hundred ..	12	10	0	..	18	0	0
Deck Deals, per 40 feet 3 in.	1	0	0	..	1	8	0
Lathwood, per fm. of 4 feet........	6	0	0	..	7	10	0
Petersburgh, Riga, and Archangel .... Yw. Deals, per stand. hundred..	15	10	0	..	17	10	0
White..........................	13	0	0	..	14	0	0
Yw. Battens......................	16	10	0	..	17	10	0
Riga Logs, for 18 feet cube	3	15	0	..	4	15	0
Stettin Staves, per mille of pipe..........	75	0	0	..	115	0	0
Swedish Timber, per load	3	5	0	..	3	10	0
Gothnb. Yw. Deals, per 100 12f. 3in. 9in...	23	0	0	..	27	0	0
White ditto	21	0	0	..	25	0	0
Yw. Battens, per hd. 12 ft. 2½ in. 7 in.	13	0	0	..	16	0	0
Christiania Yw. Deals, per hd. 12ft. 3in. 9in.	28	10	0	..	29	0	0
White	26	10	0	..	27	0	0
Quebec and St. John's Spruce Deals.. per 100, 12 ft. 3 in. 9in.	15	0	0	..	18	10	0
1st qual. yw. Pine Deals, per st. hd.	13	10	0	..	16	10	0
Second do. do.................	11	0	0	..	12	0	0
RedPine Deals, per hd. 12ft. 3in. 9in.	20	0	0	..	25	0	0
Red Pine Timber, per load	3	7	6	..	4	5	0
Yw. ditto	2	15	0	..	3	5	0
Birch ditto	2	10	0	..	3	15	0
Elm ditto	3	0	0	..	3	10	0
Oak ditto	4	0	0	..	4	15	0
Standard Staves per mille standard	45	0	0	..	55	0	0
Puncheon ditto	14	0	0	..	17	0	0

MAHOGANY, &c.

Mahogany,	St. Domingo	6½d.	to	1s.	9d. per foot.
	Cuba	6		1	0
	Honduras..............	4½		1	2
	African	4		0	5½
Cedar	Havana	4½		0	6
Rosewood.	Rio	12*l*.	0s.	to	20*l*. per ton.
	Bahia....................	10	0		14

FLAX.

BELFAST, (Friday last.)—Flax: fine, 60s. to 65s.; good, 56s. to 58s.; good middling, 49s. to 52s.; middling, 40s. to 45s.; coarse, 34s. to 40s per cwt.

WOOL MARKETS.

BRITISH WOOL.

HUDDERSFIELD, Feb. 15.—We have no improvement to report in our market for this week. Very little business has been done, and the continuance of failures considerably depress this part of the country. This morning there is rather more inquiry for fine Botany Wools, at from 1s. 6d. to 1s. 9d. per lb.

LEEDS, Feb. 18.—There has been a little more activity in this branch of trade during the past week. The London colonial wool sales continue to be very numerously attended, and the prices since obtained have established the advance reported in our last report.

SALISBURY, (Tuesday last.)—There are yet some large holders of wool in this neighbourhood, who refuse taking the present prices offered, looking for a further advance. The best teg wool from the most careful graziers is worth 12d. per lb.; small lots, 11d. ditto; three-fourths teg wool, 9½d. to 10d. ditto; half-and-half, 9d. ditto; best long wools, 11d. to 11¾d. ditto; moderate ditto, 10d. ditto; inferior, 8½d. ditto; coarse lots, 7d. to 7½d. ditto.

LIVERPOOL, Feb. 19.

SCOTCH.—There has been more doing in laid Highland wool, also a better demand for white. There has also been a fair inquiry for crossed and Cheviot, without any variation in price.

		s.	d.		s.	d.
Laid Highland Wool, per 24lbs		5	6	to	6	3
White Highland do................		8	6		9	3
Laid Crossed	do .. unwashed....	8	0		9	3
Do.	do... washed	9	0		10	6
Do. Cheviot	do... unwashed....	8	6		11	0
Do.	do... washed	12	0		15	6
White do.	do................	18	0		21	6

FOREIGN.—The public sales of wool in London are going off with considerable spirit, which gives a better tone to our market, and a fair amount of business is doing at late rates.

FOREIGN.

The public sales of wool have been in daily progress.

On Monday Messrs. Southey and Son offered 1,512 bales. There were 519 bales Australian sold at 11½d. to 2s. 2½d. for clean sheep's, at 2s. 3d. for scoured, and at 1s. 2½d. to 1s. 7d. for lambs'. Port Phillip brought 1s. 0½d. to 1s. 4½d. for washed sheep's, and 8½d. to 1s. 3d. for lambs'. Van Diemen's went at 8d. to 1s. 9d., and Cape of Good Hope at 7d. to 1s. 2d. per lb.

On Tuesday, Messrs. Marsh and Edenborough offered 1,383 bales. There were 240 bales Australian sold at 1s. 1d. to 2s. 1d. per lb., 153 bales Cape at 7d. to 1s. 5½d., and 957 bales Port Philip at 10½d. to 1s. 6½d. for washed sheep's, 8d. to 1s. 6½d. for lambs', and 1s. 1d. to 1s. 10d. per lb. for scoured.

PRICES OF MANURES.

Subjoined are the present prices of several sorts of Manure:—

Agricultural Salt, 30s. per ton
Alkalies, 28s. and 42s. per cwt.
Boast and Co.'s (Bow) Inorganic Manures, from 6s. to 11s. per cwt., according to crop
Boast's Guano, 9*l*. 9s. per ton
Carbon, 12s. per qr.
Chie fou, 21s. per cwt.
Chloride Lime, 28s. per cwt.
Clarke's Compost, 3*l*. 12s. 6d. per hhd., sufficient for three acres
Fothergill's Gypsum, 35s. per ton.
Fothergill's Phosphate of Lime, 8*l*. 10s. per ton
Graves, 6*l*. 10s. per ton
Guano, Peruvian, 9*l*. 9s.; Bolivian, 9*l*. 9s.; African, 6*l*. 6s. to 7*l*.10s. per ton, according to analysis and quantity
Gypsum, 30s. per ton
Highly Concentrated Manure, 30s. per qr.
Humus, 14s. per qr.
Bone-dust, 18s. 6d. per qr.
Half-inch Bone, 17s. 6d. per qr.
Hunt's Stuff Graves, 3s.6d. cwt.
Hunt's new Fertilizer, 13s. 4d. per qr.
J. T. Hunt's Artificial Guano, 9*l*. per ton
Manure Powder, 16s. per qr.
Muriate of Lime, 6s. per cwt.
Muriate of Ammonia, 25s. per cwt.
Nesbitt's Manures (prepared by the London Manure Company) 8*l*. to 14*l*. per ton, according to crop
New Bristol Manure, 8s. per qr.
Nitrate of Soda, 14*l*. 10s. to 15*l*. per ton
Nitrate Potash (saltpetre), 26*l*. to 28*l*. per ton.
Patent Disinfected Manure, 9*l*. per ton
Petre Salt, 2*l*. per ton
Potter's Guano, 9*l*. per ton
Preparation for Turnip Fly, 10s. 6d. per pakt. sufficient for three acres
Rags, 4*l*. to 4*l*. 10s. per ton
Rape Cake, 6*l*. per ton
Rape Dust, 6*l*. 6s. per ton
Soap Ashes, 10s. per ton
Soda Ash, 12s. per cwt.
Sulphate Soda, 6s. per cwt.
Sulphur for Destroying Worm on Turnips, 12s. per cwt.
Sulphuric Acid, 1¼d. per lb.
Superphosphate of Lime, 7s. 6d. per cwt.; 7*l*. per ton
The Liverpool Abattoir Company's Animalized Manuring Powder, 2*l*. 10s. per ton
The Urate of the London Manure Company, 4*l*.4s. per ton
Willey Dust, 4*l*. 4s. per ton
Wolverhampton Compost (Alexander's), 12s. per qr., subjec to carriage to London, or forwarded from Wolverhampton

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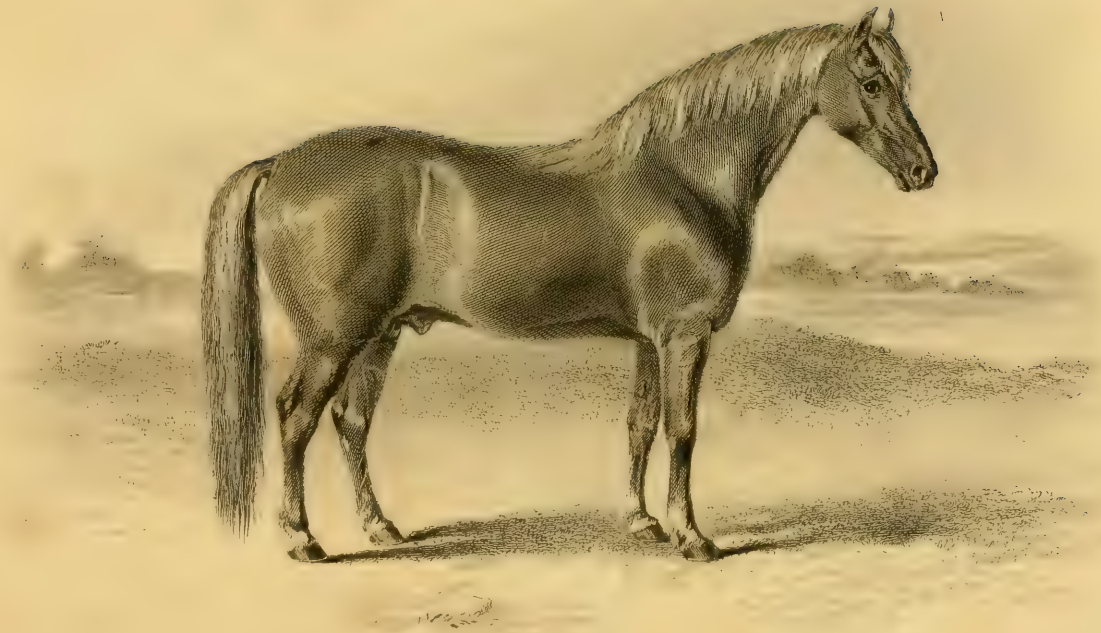


THE FARMER'S MAGAZINE.

APRIL, 1848.

No. 4.—Vol. XVII.] [Second Series.

PLATE I.

SHORT-HORNED OX.

BRED AND FED BY MR. W. D. MANNING, OF ROTHERSTHORPE, NEAR NORTHAMPTON.

The subject of our first plate, a short-horned ox, was bred and fed by Mr. W. D. Manning, of Rothersthorpe, near Northampton. This animal obtained the first prize and the Silver Medal at the Smithfield Club Cattle Show, in December last. The Gold Medal was also awarded to the exhibitor for the best ox or steer in the first, second, third, fourth, fifth, and sixth classes. This ox was pronounced by competent judges to be one of the most complete ever exhibited at the Smithfield Show, and reflects great credit on Mr. Manning. So highly are Mr. Manning's ability and energy as a tenant-farmer appreciated by his brother farmers of Northamptonshire, that a subscription has been commenced with a view to present him with a piece of plate, as a testimonial for his having shown so fine a specimen of the short-horned breed. We understand that Mr. Manning was induced by his excellent landlord, Thomas Caldecott, Esq., of Rugby Lodge, Rugby, to commence breeding short-horns; and the subject of our plate was got by a bull by Eclipse (3684), the property of that gentleman, by a well-bred short-horned cow, "Dahlia," by Magnum Bonum (2243).

Mr. Strafford (the editor of the "Herd Book") had chosen this animal for his Royal Highness Prince Albert, but through some unforeseen circumstance the purchase was not completed, and hence Mr. Manning became the successful exhibitor.

His dead weight was 229 stones 5 lbs., and the loose fat 22 stones 8 lbs.

PLATE II.

CART STALLION.

The horse, which forms the subject of our second plate, is the property of the Right Honourable Viscount Hill, of Hawkstone, near Shrewsbury; and obtained the first prize in the third class at the Royal Agricultural Society's Show at Northampton, in July last, as the best two year-old stallion for agricultural purposes.

ON COMMON SALT AS A SPRING DRESSING.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The period of the year being now favourable for the use of salt as a fertilizer, I again recur to the examination of a few of its uses. It is now some years since I first commenced my experiments on this cheap, plentiful, and portable manure; and if, after the lapse of so many years, the employment of salt is still not so general by the farmers as its merits should ensure, this must only be regarded as arising from its erroneous application, and from a want of the requisite care in testing, at harvest time,

the results. There is one crop—the potato—to which it has been found (especially when mixed with earth, compost, or marl) peculiarly adapted. Upon this, I have reported in another place the result of some trials which I made, some years since, on a poor hungry gravel, in Essex. These were as follows, in bushels per acre:—

Without any manure	120
Manured with 20 bushels of salt, the previous September	192
Manured with stable dung at the time of planting	219
Manuring with stable dung and 20 bushels of salt	234
Manured with 40 bushels of salt alone; 20 in September and 20 in the spring, after the sets were planted	192½
Manured with 40 bushels of salt, as in the last experiment, and also with stable dung	244

These experiments are supported by those of the late Rev. E. Cartwright, of Tonbridge. From a copious table, which the farmer will find at page 82 of my Essay on Salt, I extract the following statement of the produce, in bushels per acre:—

Without any manure	157
Manured with 9 bushels of salt per acre	198
Manured with 8 bushels of salt and 30 bushels of soot per acre	240
Manured with 30 bushels of soot per acre	182

The mixture of salt with weeds, ditch-scrapings, and old hedgerow banks of earth, at the rate of, say, 56lbs. to a cubic yard, a few days before the mass was carted on to the field (say, at the rate of 30 cubic yards per acre), I have found to be invariably productive of the best results upon potatoes. On the Essex soils, to which I have referred, the effect of the salt appeared not only in the increased bulk of the crop, but in the clearness of the skins of the potatoes; and we fancied that they were also rendered more mealy. I am particularly anxious that the farmers of these islands should direct their early attention to this mode of using salt; because I feel assured that in this way they will have neither difficulty in its employment nor doubt of its advantages. On this branch of the enquiry let me, in this magazine, repeat the recent testimonials which I have elsewhere adduced in favour of its uses, as a mixture with the ordinary manures of the farm, by two or three practical farmers, in widely different soils and situations.

First, then, as to the value of salt as a mixture with the refuse collections of a farm. Mr. Robert Forbes, of Elgin (*Gardener's Mag.*, vol. iv. p. 82), gives an instance of its power. He says: "Last summer I had collected a large heap of couch and other weeds from the ground on which a crop of turnip-seed had been sown, and the weather being showery, it grew into one mass of roots, with a crop of grass on the surface that might have been made into hay. I applied over the whole of the heap a thick covering of salt, and in less than a week not a vestige of vegetation was to be seen; and when turned over soon after, and a new surface exposed, no second growth appeared, and it is now a mass of rich mould." It may be well to add another observation of Mr. Forbes', in corroboration of the fact that common salt enters largely into the composition of mangel-wurzel and other root crops; for, when commenting upon his own experiments with salt, applied as a manure by itself to various crops, he observes: "Salt seems to agree with mangel-wurzel better than with any of the other crops to which I applied it, and scarcely any difference could be observed in the crop when growing between the compartments manured with salt and that manured with dung; and when weighed the difference was trifling, and rather in favour of salt." The quantities of salt, however, which he employed were much too large. The following table gives the proportions, and the results *per acre* in *tons*:—

Salt, 2 tons,	produced	39	tons of	mangel-wurzel.
„ 1½	„	40	„	„
„ 1	„	41	„	„
„ 0½	„	40	„	„
Moderate dunging		40½	„	„

Again, in a recent communication of Mr. John Wilson's, of Aston Claverly, near Wolverhampton, to the Bromsgrove Farmers' Club, he observes:

"We are very subject to grow scutch, and many of us (to our shame) much more than we ought to do; but when we have it, we endeavour to make the best use of it, and I have now mine in a state of preparation for the land for turnips. I draw it in heaps in autumn, apply a considerable portion of salt to it in the winter; after which, and turning and mixing, I add fold-yard manure; this I again turn and mix, placing a layer of scutch at the bottom of the heap, and also a layer on the top, over which I strew salt sufficient to keep the surface moist, and prevent the escape of the ammonia. In this state it remains until about three weeks of the time I want it for the turnips, when I again turn it; and when used, it comes out an excellent manure, which it would not do without the application of salt.

"We also use it advantageously in heaps of vegetable compost for rough grass land of light or sandy texture; and I believe the greatest mistake in the use of salt is that of applying it to cold strong arable land, where I think it worse than useless; but when used judiciously on light soils, containing vegetable matter, it will be found very valuable for nearly every description of crops; and as it is now

to be had at a reasonable rate, I have no doubt it will be extensively used, and that very beneficially."

And, in a late communication of Mr. J. Mathew's, of Park Hall, near Kidderminster (another practical farmer), to the same excellent farmers' club, he remarks:

"My experience of its effects is confined to light soils, and upon such I know of no article so greatly and so generally beneficial. Its copious use to every description of stock I regard as indispensable. For turnips, barley, clover, and wheat, it is equally beneficial, used either as a top-dressing, or worked into and incorporated with the soil. Nor is it of value only as regards an *increase* of produce; for I have always found the *quality* greatly improved where it has been used largely. The fold-yard should have an abundant supply: it should be applied at the least once in every week. Upon grass lands, whether upland pastures or watered meadows, I have found its use alike advantageous. I have generally applied it in the form of a compost with soils, but I do not consider this as necessary. Last spring I dressed a meadow of five acres with salt and soil, putting on about 30 cwt. per acre of salt: the effect was most convincing, both in the hay crop and aftermath. The sheep and cattle I turned into it had access to an adjoining meadow, and their preference for that which had been salted was truly ludicrous; they could not be induced to leave it when it was as bare as a common, while the other meadow had abundance of grass upon it."

Whilst these results have been obtained in the West of England, we find that the same success has, on the opposite side of the island, attended its use. I have the report now before me of two practical Essex farmers, each cultivating soil of a very different character to the other.

On this head my friend, Henry Dixon, of Witham, offers valuable evidence. He observes (*Agricultural Gazette*, 1847, p. 787): "I will give in detail two methods of its application in usual practice on my farms: 1. I have taken away a considerable proportion of crooked fences and useless trees, and thus made small fields into larger, and of better shape. These hedgerows and banks produced large heaps of vegetable matter, couch, and other weeds. This, with woody fibre and leaves, trimmings of hedges and ditches, in short, any undecomposed vegetable products, can from time to time be added to the mass, which accumulates till this season of the year (October). In the autumn I have the mass forked over, and freely mixed with salt, and then closely compacted together in one yard. It being convenient, I have it also well wetted with tank liquor. In this state it is left till the following summer, when I find it one of my best and most efficient manures for any purpose. It may be sifted for drilling with guano, or other fertilizers; but I have not so applied it. 2. Salt forms part of the general mixed manures, or dung-hills, on my farms; for the formation of which my plan is as follows:—I have abundance of calcareous marls at hand, as well as mud and scourings from a river, or the ditches connected with it, and turf taken from the grips of flooded meadows. These I endeavour to collect a year beforehand, to give the advantage of exposure to sun, water, and frost, turning the collection over at least once. I then use this as a bottom for the common dung from the cattle yards; its proportion to the whole is about one-third. I allow the dung to heat and ferment moderately, which it will do, if the dung be good, in about 10 or 14 days. I have the whole then well mixed, sprinkling in 12 or 15 bushels of salt to about 100 cubic yards of the entire mass. I then cover the whole with six or eight inches of burnt earth. No further heating to the detriment of the manure will occur, if care be taken to have the soil well and uniformly mixed, nor will any considerable drainage exude from the compost while it remains in this state, till the following summer, when it is required for various purposes."

Mr. Mechi adds (*Agric. Gazette*, Nov. 23, 1847) some valuable evidence as to the value of salt in the way just described. He observes: "During the last twelve months I have applied salt very liberally to my manure in the yards and tanks. The salt was brought in by the cartload, and spread or thrown about by the shovel. My bailiff was alarmed at the quantity, but we carted the manure and ploughed it in, and there are now growing upon it wheat, tares, and winter barley, all looking perfectly healthy. The animals seem much more healthy when they have access to salt. I have at least 120 pigs in my yards, and have not lost one for six months. The salt is applied freely, and frequently to the corner where the pigs dung. It removes effluvia very quickly. Any weeds that are collected are placed in heaps, and readily decomposed by admixture with salt. My observations," he adds, "lead me to the following conclusions: That salt and water are destructive to wireworm, slug, and other vermin; that salt decomposes very rapidly any insect, or dead vegetable matter, without injury to growing vegetation; that salt is injurious to heavy or wet and undrained lands, making them wetter and colder, and delaying vegetation; that it forwards the crop in drained lands; that it attracts and retains moisture (one fine summer's morning in July I observed some fresh sown land covered with moist spots about the size of a shilling, the other parts being perfectly parched. These spots were covered by the salt which had been sown broadcast a day or two previous. The moisture had been attracted from the dews. I also

observed a similar effect, about a fortnight since, on a foggy day); that salt blanches, or bleaches, the straw of cereals, giving them a whiter cast. The increase in weight and quality is more observable in the grain than in the straw, although the latter is very solid and brittle, not light and frothy; an abundance of weak, crowded, frothy straw too often deceives as to the actual produce." And again, recurring to the action of salt on insect vermin, he continues: "My swedes escaped the ravages of the cockchafer grub on the salted manure, and are of a very heavy quality and a full plant." There are many other practical farmers ready to give evidence of the destructive effects of salt on insects; and this is a branch of our enquiry far too important to be much longer neglected, or left to the examination of chance-directed trials. What has been recently reported promises exceedingly well. To give only the reports of two practical farmers:

Mr. James Wallington, of Charlcote, in Warwickshire, remarks, in a letter dated Nov. 17, 1846: "I have in my occupation a good sandy or turnip soil, which, for many years, has been worked on a six-course system; breaking up for wheat two-years-old seeds, which invariably lost plant in the winter. I attributed this to wireworms in some cases, and small green worms in others; the land becoming very light in the spring, and the crop much injured. I applied salt very satisfactorily, and afterwards dressed every acre I broke up, at the rate of 8 cwt. per acre, until I had dressed every acre of that description, both in my own occupation and what I had charge of for an employer; and in one instance I used 10 cwt. per acre. The method I pursued was this: After breaking up the land, I had the salt sown. After a few days, the land was well harrowed and drilled, &c., in the usual way. This plan I have adopted once over upwards of four hundred acres, and can confidently say that I never had, in any one field, a yard of ground without a good plant of wheat during the course of salting. When I first used salt, I frequently left portions of the field, as a criterion, and found that, in the first instance, the wheat grows slowly in the salted ground; but, as the spring advanced, it strengthened and surpassed the other, and at harvest it was much stronger and clearer in the straw, and *free from rust or mildew*, and the produce and quantity decidedly the best."

A Derbyshire farmer is still more decided in his opinions as to the effect of salt upon the wire-worm.

Mr. William Beardsley, of Shipley, near Derby, observes, in a letter to the editor of the *Derby Mercury*: "I apply salt as a top dressing to all my white crops (I have been using salt pretty freely for 10 or 12 years past), in the months of April or May, as the season may be, by sowing broadcast three or four cwt. per acre, taking care to do this after sunset; and I repeat this dressing in about three weeks, if required, which seldom happens. If the young plant should appear sickly and turn yellow, it is a true sign that the slug and wire-worm are making ravages upon it; and I have always found the application of salt to exterminate these destructive insects. I believe that slugs, &c., will not generate in lands so treated. I have found that my yield of wheat is four bushels to the acre more from the salted than from the unsalted land, when all other circumstances have been precisely the same; and I also find that where salt has been employed I get a much bolder, brighter, and heavier sample of wheat; and I have been entirely free from rust, blight, or smut, ever since I have been using salt." Mr. F. Fairbank, of Sible Hedingham, thinks, from repeated trials, that salt, at the rate of four bushels per acre, dug in the previous winter, is a complete preventive of the louse in peas.

In the month of April, then, I would again remind the farmer, he may use salt for his compost heaps of all kinds (and the compound may be used for potatoes), as a top-dressing for wheat (Mr. Hannam sowed it, with great advantage, on the 2nd of May, upon wheat, barley, and oats—*Jour. R. A. S.*, vol. 5, p. 276), spring corn, and grass land, not only as a manure, but for the destruction of vermin. Let the cultivator remember, in considering the uses of common salt in agriculture, that, with perhaps the single exception of gypsum (the sulphate of lime), there is no other fertilizer so cheap and so portable. If a ton will suffice for dressing two or three acres, and if that ton can be obtained for about 30s. (it is only worth about 10s. at the salt works), we may reasonably conclude that a more economical agent can hardly be employed on the soils of our country.

EVERGREEN SHRUBS.

BY J. TOWERS, MEMB. R.A.S., H.S. OF LONDON, &C.

The subject of this paper has been suggested by the articles that have appeared lately in the "Gardener's Chronicle," on the transplantation of the holly-tree; and, as the present month has been considered by one of the leading writers as the most suitable, I offer the following remarks at this exact period when they may be most appositely introduced.

Some time since, it was my desire to call the at-

tention of farmers to the tree, as of all others most desirable for the formation of hedges. The holly is indeed a most beautiful shrub, equally hardy, tractable, and ornamental; and if properly treated, would in a few years be found to possess, in a superior degree, every quality required to produce shelter, shade, and defence. But the holly—like all other evergreens—is arbitrary, and cannot submit to be trifled with. It remains, then, to study its habits, and thus, aided by experience, to ascertain how it should be treated; also, at what period, and of what size, it ought to be transplanted. But, in order to arrive at a certain conclusion, a few observations on the natural history of the plant must be premised. Botanically, it has clusters of small one-petalled, four-parted, white flowers, each with four stamens and four styles; fruit, a berry with four cells; as many seeds; ripe in winter, and fit for sowing, but tardy in germinating; whence it is that the berries are usually kept in sand or other light earth for one year, so that the outer integument may decay, and thus, by the chemical process of putrefaction, stimulate the vital action of the individual seeds; which, when then sown, will germinate more freely and regularly than if they are sown as soon as ripe in the open ground, where they might be injured or devoured in great numbers, while the few that remained would, after two years, come up in disorderly patches.

Hollies abound with a thick tenacious fluid; which, when prepared by art, constitutes the viscid substance called bird-lime. And here, though I have no direct authority, or possess any evidence of the fact, it occurs to me that as caoutchouc (India rubber), and the newly-discovered substance—gutta percha—are obtained from the inspissated proper juices of tropical trees, the tenacious and viscid substance yielded by the holly may be converted to some purposes of a like nature, of far greater utility than that of catching small birds or insects; and I offer the suggestion solely to promote inquiry.

As to the *period of planting*. The first authority to which I refer is a letter from Mr. Rogers, inserted in the "Gardener's Chronicle," of February 5; in it we read—"I believe that spring is the best time, and the last three weeks of April the very best time of all the year for moving hollies; and that November is the very reverse (August not excepted), and for the following reasons:—1st. Upon repeated trials during the last twelve years, in various soils, with plants varying from six inches to ten feet in height, I have found plants moved in April flourish quicker and better than when moved at any other time. 2nd. I have taken up at that season plants which had been moved in the previous November, and on examining them have found not a particle of fresh fibre, and I have noticed that such plants, however well they might look during the winter, suffer exceedingly as spring advances; whereas, on taking up in April plants moved in February—*i.e.*, six weeks or two months before—I have found that they had already begun to form fresh fibres; and such plants generally retain a healthy appearance. 3rd. I have moved plants of *the same batch*, six feet high, some in November and some in April, with equal care, and those moved in November have languished for years, and in fact never recovered, while those moved in April were completely established in twelve months. So much for experience."

I observe on the above, that hollies, and *other evergreens*, differ from deciduous trees, inasmuch as they never have what may be considered an entire season of rest—one wherein the foliage becomes torpid and effete. Hence, *that foliage* is always vitally connected with the ground; and therefore removal at any time must be more critical than with deciduous plants. November, and thence to February, I conceive to be the worst period or quarter of the year; because, as some disruption of the fibre must take place, the leaves, that would have remained green and negatively active, become, perforce, more or less torpid, and incapable of attracting, during the frosts and snows of winter, any of the sustaining sap. Again, evergreens *do* shed many of their leaves in the spring, but not till renewed vitality and growth become active. Now, from February 1st to the end of April, the trees are in a state of *preparation*, ready to start so soon as the spring heat shall be established. The great art of the planter, therefore, consists in selecting very *young* trees—the smaller the better—when the ground is in a fitting state of moisture, and the weather showery. If large trees are planted, and especially if some days elapse between the raising and resetting, and aridity supervene, the labour will be in vain, as being bestowed upon plants that must inevitably languish. Hollies root very freely among decaying leaves. Of this any one may satisfy himself who can investigate the beech-woods in Buckinghamshire. The lower small branches of large holly bushes bend down and trail along the surface: there they lie covered with leaves, and from such situations I have known some thousands of young rooted layers transferred to land that was to be fenced off by a holly-hedge. A deep trench was first digged, and its bottom covered with a very deep layer of half-decayed tree leaves raked from enclosures; upon those was laid a sufficient quantity of earth, on which the hollies were placed, and their roots duly covered with more earth. They succeeded, but suffered much by the ravages of rabbits, which abound in those localities.

If young plants, from six inches to a foot high, be speedily and carefully planted during February, and thence to the end of April, provided plenty of rain fall, I conceive that not one plant in a hundred will flag in the slightest degree. Again, from the first of September to the middle of October, the operation will in general prove successful.

I now recur to the "Gardener's Chronicle," of the 12th February, in order to cite the authority of Mr. Macnab, of Edinburgh, "than whom," as the editor remarked, "we have no writer on gardening matters of more sagacity and experience." He recommends planting late in autumn, in winter, or very early in the spring; that is, at any time from the middle of October to the middle of February, and general "the beginning of this period is the best." The learned editor sanctions all that Mr. Macnab has adduced; but I have not space to enter into his argument, as it is essential to extract a few lines from the evidence of that gentleman. "There can be no secret," he says, "in the proper treatment of evergreens: if there were, I should say that it is in preventing their roots from becoming dry when out of the earth, and to choose moist and cloudy weather for planting. If the roots of evergreens be allowed to dry when out of the ground *in spring*, it is scarcely possible to prevent their suffering considerably, and showing this injury for a long period after they are planted..... Though I know no means by which I can divine what the weather may be some days after planting; yet we all know that in winter there is a greater probability of moist cloudy weather than at any other season, and that even if the weather become clear, yet the sun is but a short while above the horizon in winter, and has but little influence. Half a day's sun, in spring or autumn, will do more harm immediately after planting than a whole week's sun from morning to night in the middle of winter."

Macnab includes the greater number of evergreens when he thus expresses himself; and certainly the laurel, Portugal laurel, arbutus, sweet-bay tree, &c., &c., are not exceptions. I have stated, above, my opinion concerning the seasons most suitable, and shall close this article by an appeal to positive experiments which came under personal observation; one of these I lately made public in the "Gardener's Chronicle." In July, I think, of the year 1837, there was a number of spare young laurels, which we wished to move. A bank of very poor loam had been formed within a fence, and I was recommended by a gardener, then at work with me, to form a laurel hedge upon this bank. I hesitated at the season and state of weather: the man, however, was confident; and as the soil was not dry, we made holes in it of proper size, moved the laurels one by one, deposited them in detail, insinuated the fine earth among the fibrous roots, "puddled" the whole with water, fixed each tree by more earth superadded, and subsequently kept the soil duly moist. Not a plant failed; the laurels planted a yard apart—being about thirty inches to a yard high—grew rapidly, and in a few years filled the intermediate spaces, and produced a compact broad hedge, above twenty-four yards long, and about seven feet high.

In 1844, during the most arid month of May, I endeavoured to form a dwarf holly hedge at the side of a small shrubbery, with young plants a foot high. The nurseryman left them for me with a tradesman, who failed to deliver them for two days. I planted them in a soil abounding with leaves, taking every precaution, and gave water occasionally. Two failed, and these I replaced. Thus, although I agree in theory with Mr. Macnab and Dr. Lindley, facts constrain me to abide by the opinion which is expressed above; namely, that more depends upon despatch in removal, a moist condition of the earth, shade, and due supplies of water, than upon any precise or arbitrary season of the year.

HIGHLAND AND AGRICULTURAL SOCIETY.—DRAINAGE OF LAND.

March 1.—The secretary read a communication from Mr. Simson, of Pitcorthie, in Fifeshire, in reference to the drainage of his estate on what is termed the deep system. The subsoil at Pitcorthie is very variable—muirband, till, or stiff dry clay, rock, and peat, all rapidly interchanging; some fields have a sandy and others a loamy substratum. The general declivity of lands admit of easy outfalls. In every field where no natural obstacles presented themselves, the minimum depth of drain stipulated for with the tenant was four feet, and the minimum distance from drain to drain 36 feet. These were in many instances much exceeded. In some particular fields, on the other hand, a stratum of what is called "draining metal" was found, and in such places the drains were found to work sufficiently well at a depth of three feet. A diminution of depth generally involved that of distance, and a consequent additional outlay for drains and pipes, though, in a flat part of the estate, where the outfall could not command a greater depth than three feet, the drains have done their duty at a dis-

tance of 54 feet; this, however, was in porous peat moss. Mr. Simson made particular reference to one field at Pitcorthie, where the drains were set out by Mr. Parkes's foreman, at a uniform depth of four feet; the subsoil consisted of the stiffest and most obdurate clay, apparently impervious to water, and contained large masses of stone; the drains were cut when the ground was in its hardest condition, and labour at its highest rate. The depth of the drains in this field had been objected to by some, and though Mr. Parkes did not contemplate immediate success, the result has been most satisfactory; during the late tremendous rains the outfalls have been in full operation, and not a drop of water has been lodged on the surface. The materials used at Pitcorthie were pipes, varying in size from one to three inches in diameter, according to their different purposes; in some cases from deficiency of supply of these, horse-shoe tiles and soles were used. The pipes were generally secured by collars or rings. The draining tools were manufactured by Messrs. Linden, of Birmingham, and furnished by Messrs. Redpath and Brown, of Edinburgh. A great portion of the work was executed uner circumstances the most unfavourable in point of cost, from the time at which it was done, the high price of labour, and the difficult nature of the land; the actual average cost, however, including all charges, except that for carriage, amounted to £3 17s. per acre. Similar operations have been carried on at Leetham, another property of Mr. Simson's, with results equally satisfactory, but attained with greater ease and at less expense, owing to the more favourable nature of the soil and locality. Mr. Simson, on the whole, expresses himself as sufficiently imbured with the spirit of deep draining, to recommend a uniform depth of four feet, and some of his tenants, who at first entertained and had put in practice very different opinions, were now convinced of their error, and converts to the deep system.

Mr. Dickson, Saughton Mains, said, that when in the neighbourhood of Pitcorthie, in October last, he had much pleasure in witnessing the drainage works carrying on there, and he thought much was due to Mr. Simson for the very spirited manner in which he had adopted Mr. Parkes's system. So far as he observed, a considerable portion of Mr. Simson's lands seemed well adapted for the system of deep drainage. But he did not agree with those who thought that any given depth can be fixed as suitable for all soils and subsoils, and he must say that all his experience led to the very opposite conclusion, namely, that the depth of the drains, and the distance between them, must be regulated by the nature of the soil and subsoil. He frequently found it expedient on the same farm, and occasionally on the same field, to vary the depth of the drains and the distance between them to suit the varieties of the subsoil. He by no means, however, objected to the depth of four or five feet, on the ground, which he had often heard stated, that the water would not get into the drains from the surface, for he had no fear for such a result; but he found it to be requisite on a large portion of the lands now requiring drainage, in order thoroughly to dry them, that the distance between the drains should not exceed from fifteen to twenty feet, whatever might be their depth; in such cases the expense of making the drains so deep would preclude the execution of the work altogether. He was aware that some parties held that every description of land might be drained at a much greater width between the drains than he had stated, provided the drains be made sufficiently deep; but he knew several instances where land had been drained at the depth of four feet and 36 feet apart, which, after several years' trial, was found to be only half drained, and, in order to the completion of the drainage, it was found requisite that an additional drain should be made between the old ones. He had also observed, in going along the sides of cuttings in railway lines, through undrained lands, that where the cuttings were above ten feet deep, in some fields the ground on each side of the cutting was laid dry for 20 or 30 feet; while in other fields, at the same depth of cutting, the land was not laid dry for more than eight or ten feet. It was thus obvious that the same system of drainage could not be judiciously applied in both cases. He would mention a case as an example of what frequently occurred: on the farm of Chestertown, on the estate of Largo, in the county of Fife, the soil being a strong clay, the tenant had commenced draining his lands at the depth of 2½ feet, with an interval of 18 feet between the drains; the subsoil to this depth was a retentive clay. At the earnest request of the agent of the proprietor, he tried one-half of a field with drains four feet deep and 36 feet apart. On getting to the depth of three feet, the subsoil changed to gravel and sand, in which there was an immense flow of water, and the result was that that portion of the field was more thoroughly drained than the other, and at much less expense, which induced him to drain the remainder of his farm with deep drains; and the same method had also been adopted by the tenant of the adjoining farm with complete success. On two other farms, however, on the same estate, he found that a similar system of drainage would not answer, and that it was necessary to lessen the distance between the drains in some fields to 24 feet, and in others to 18. He had also seen, in the same county, on a neighbouring property, an experiment of the same kind tried with

the opposite result, the subsoil being a very retentive clay. Here one-half of a field was drained at the depth of four feet and 36 feet apart, and the other half at the depth of 2½ feet and 18 feet apart, and the result was most decidedly in favour of the 2½ feet deep drains, with an interval of 18 feet between them, the other portion of the field appearing to be only half drained. He had no doubt, however, that time would improve the deeper drainage. He lately inspected two farms in the neighbourhood of Paisley, of flat clay land, which had been thoroughly drained at considerable expense 15 years ago; but in consequence of the drains having been made too shallow, and engine ashes and small stones placed above the tiles, which afforded too ready access for the surface water to the drains, carrying with it the finer portions of the soil and manure, he found the drains completely choked up and useless, and was obliged to have them lifted and re-laid at greater depth. In his opinion, one reason which had conduced in this country to the general adoption of too shallow and superficial a system of drainage was, that it had been carried on to a great extent by the tenants at their own expense, who naturally adopted such a plan as would insure them the best return during the currency of their lease, without considering the sufficiency or permanency of the works, when it would have been greatly to the advantage of all parties had the proprietor been his share of the expense, and had the drainage executed in a more durable manner, as he was clearly of opinion that the tile drains, properly constructed with sufficient outfall, would continue to improve in efficiency the longer they ran. With regard to the use of pipe tile, and tile and sole, for laying the drains, he held it to be immaterial which of them was used, except in so far as regarded the difference of expense. He would not use pipe tiles without collars where there was any moss, quicksand, or a stony, unequal bottom; and he preferred the size of the two-inch pipe or tile for the ordinary drain, as, although the one-inch tile or pipe might be large enough to contain all the water, he considered it desirable that there should be room also for a current of air to pass along the drain, and the larger tile afforded a greater allowance for any inaccuracy the workmen might make in laying them. In offering these remarks he might state he had had considerable opportunities of observing the results of draining in varieties of soil and subsoil for the last 20 years, and had at present drainage works carrying on under his superintendence in nine different counties.

Mr. Scott, Craiglockhart, said, that not having had an opportunity of seeing the lands on which Mr. Simson's drainage operations had been executed, it would be unwarrantable in him to express any opinion as to their efficiency; but some of the statements, however, were at variance with what he conceived to be the proper principle of draining, and with the result of his own experience. They were told that on all soils, whether muirband, till, or stiff dry clay, sand, gravel, or moss, a minimum depth of four feet drains is stipulated for, and a minimum distance of 36 feet apart; although drains three feet deep had been tried, and with such success that a concession had been made from the strictness of the principle laid down. While, however, he differed with Mr. Simson and Mr. Parkes, as to the distance at which drains ought to be put in apart, he perfectly agreed with them in opinion that hitherto, in our system of furrow draining, we had erred, both in making the drains too shallow, and also in using unnecessarily expensive material; but to suppose that a uniform depth of drains and distance apart could be laid down for all soils, would just be as reasonable as that a uniform mode of working and cropping would be applicable to all lands, without paying any attention to the nature of the subject you had to deal with. The result of his experience had been, that while it may be necessary, in order to effect the thorough drainage of some lands, that the drains be put in to the depth of four, five, or even six feet, the object was generally effected by drains three feet in depth, the distance apart being regulated by the nature of the subsoil; and when he talked of thorough drainage, he meant that both the soil and subsoil, to a reasonable depth, should be rendered permanently dry—that is to say, that no more water shall be permitted to remain in the soil than what it is capable of absorbing; and although it may perhaps be impossible, by any ordinary drainage, to prevent water running on the surface during very heavy rain, or the melting of heavy falls of snow, yet so soon as these causes have ceased, no water should be seen on or in the soil; and, upon hard impervious clays, he had not been able to effect this by drains placed 36, or even 30, feet apart. He had seen the attempt made by drains 4 feet deep, placed 36,32, and 30 feet apart, also by drains 3 feet deep placed 24 feet apart, but in all those cases the result was unsatisfactory. Unquestionably, in every one of these instances, a great quantity of water was carried off by the drains, and the land was very much benefited; but still the soil was not brought into that state in which its greatest fertility could be called into operation; and in effecting this purpose upon lands which had been previously under cultivation, and laid off in ridges which were generally considerably raised in the centre, he had in general found it necessary to put a drain in every furrow; and if these be 18 feet apart, and put in to the depth of 2½ feet, when the

land is levelled the drains will be nearly three feet in depth. Mr. Scott here entered into a calculation, for the purpose of showing the cost of drains three feet deep, and at different distances, according to the porousness of the subsoil. The expense of drains 18 feet apart, exclusive of outfalls and carriage, would be £5 5s. 2d.; 24 feet apart, £4 12s. 4d.; 30 feet apart, £3 14s. He was aware that a great prejudice existed in the minds of many persons as to the use of pipes in draining. When he first recommended the use of pipes, parties asked—"How is the water to get into them?" His reply was: "Suppose you wished to carry water along the surface of a sandy soil, do you think you could do so by the use of these?" "Oh no," they replied; "it would all run out by the joinings." "Well, if you place these in the bottom of a drain where water exists, in like manner it will all run into the pipes." "Oh," then they say, "these are far too small; they won't carry off half the water." All that he could say is, that he had never yet seen as much water in any ordinary furrow drain as would fill one of these. The aperture of an 1½-inch pipe was equal to 1·76 square inches; and if you discharge twenty of these into a main drain, it would require a tile having an aperture equal to 35 square inches to carry off the water, or a circular tube of very nearly 7 inches diameter. He certainly would not recommend the use of pipes without some means of forming a connection between them; but this could be effectually done by laying a half sole below each end of the pipes; and if, when laid, a small piece of stone, or a little earth, be packed in at each side of the pipe, to prevent them shifting laterally, a straight and continuous tube would be formed from the one end of the drain to the other. Besides the saving effected in the original purchase of tile pipes, in comparison with tiles and soles, a very great saving was effected in the cartage. A well made 1½-inch pipe, 15 inches long, would weigh 2½lbs., and a half sole to each 1lb.; so that 600 tile pipes, with a sufficient quantity of soles to lay them, would weigh 18¾ cwt.; whilst 300 tiles and soles in common use make a very full load. In conclusion, while he was not prepared either to recommend the use of 1-inch pipes, or draining at those distances apart which have been advocated by our southern friends, he was perfectly satisfied that the more our attention is directed to the use of well made pipes, and to draining at a greater depth than we have been accustomed to do, the more we would be satisfied with the prosperity of its practice, and those who adopt it would profit by so doing.

Mr. FINNIE, Swanston, said that draining seemed to be the all-engrossing subject of the present day amongst agriculturists, and he was not aware of any other more deserving of the attention and consideration of practical farmers. It was quite obvious there were two champions in the field—one might be styled deep drainer, and the other shallow drainer. He did not intend to be bottle-holder to either, as he was much disposed to conclude that the controversy between them bore a strong resemblance to all domestic squabbles, which, when investigated, were found to arise from faults on both sides. What, therefore, he would propose to his brother farmers to do under the circumstances was, in the most respectful way to disarm both combatants, by simply putting to the test, in a small way at first, the system recommended by each. This he was assured of, that landlords would never carry on any successful system of drainage, unless they carried along with them the practical farmers of the country, and secured their co-operation in this, as it had been found to be necessary in every other improvement. He believed, to drain properly, you must neither go too deep, too wide, nor too shallow; and he would ask, therefore, in what way was an approximation to the truth to be arrived at. He did not think 10,000 pamphlets would serve the purpose; but farmers should just do in this as they were accustomed to do in other matters connected with their business; for instance, when a particular kind of oats, barley, or wheat, was recommended, and held up to the agricultural community as being more prolific than any other kind known, did farmers instantly sow their whole oat, barley, or wheat break with this new variety? No; like prudent and sagacious men, they, in the first place, purchased a boll or two, compared the produce with the other kinds on their farm, and then followed the good and safe maxim, that the proof of the pudding is in the eating of it. Now, it was as easy to follow the same course with draining. Let an acre or two be drained at 2 feet, as much as 2½ feet, then as much at 3, 4, and 5 feet, and the result, he would pledge himself, would dissipate every prejudice where such existed; and by-and-by, if deep draining was found the most effectual, the tenants of the country would be the first to adopt it. He saw no reason for all the clamour about farmers' prejudices. Once show a farmer where he is to obtain profit, and he must be widely different from any of his fraternity if he objected to avail himself of the right course to secure it. In this, as well as in every other thing, a little trouble must be taken, and far better adopt the conciliating and convincing course; for, depend upon it, publications alone would never secure the advancement of agriculture in this or any other country. Far be it from him to discourage the dissemination of agricultural knowledge; but unless theory can be borne out by practical results, it would soon be abandoned. He would, in a very few words, before sit-

ting down, give a short account of his experience in drains. Since he became a farmer, he had expended, of his own capital, from £3,000 to £4,000 in draining the lands of others. He generally took the precaution, before commencing operations, to dig pits throughout his fields from four to five feet deep, and then regulate his proceedings according to the nature of the subsoil. He had springs to contend with on land naturally dry otherwise; and to have attempted to make his drains any uniform depth would have been impossible, unless he had excavated the rock at an expense that would have purchased the ground. Often he could not lead his drains to any natural outlet, but was obliged to make wells in the rock, and allow the water to escape the best way it could. On those parts of his farm where rock did not interpose an obstacle to the proper depth of drains, he had often to restrict his depth from want of proper levels. But where he had level at disposal, he made his drains, upon all land where the subsoil was uniformly retentive, 18 feet apart and three feet deep; and were he to drain the same ground over again, he would follow the same course. Occasionally he found, where gravel or sand was present in the subsoil, that 36 feet apart was sufficient; and, if necessary to reach a gravel or sand bed, he never hesitated to go 4 feet deep. When he drained on hill ground, he found 2½ feet, at 36 feet apart, answer all his purposes.

Mr. Maclean, Braidwood, for the last 30 years had been draining land on the base of the Pentlands, where springs abounded in the high lands. The cross drains formerly in use proved very beneficial; and for the purpose of catching the springs, they were cut to various depths, from 3 to 6 feet. When thorough-draining first became general, the depth usually was from 18 to 20 inches; and the tiles were at first used without soles. The inefficiency of this was soon found, as well as the necessity for going deeper. Accordingly, the use of soles became general; and a minimum depth of 30 inches had been adopted by him with very satisfactory results. He had no experience in draining above 3 feet deep, but did not doubt its efficiency. It was difficult to assume any given depth or distance for drainage: these must be regulated by the nature of the subsoil. The permanency of drains was much secured by cutting drains at every 70 or 80 yards across the parallel drains, and a few inches deeper, so as to allow the passage of a free current of air, which would facilitate the percolation of water from the surface. He was in favour of a deeper system of draining, to allow facilities for subsoiling and deep working, without any chance of injury to the drains.

Mr. Lindsay Carnegie, of Kinblethmont, informed Mr. Smith as to the condition of a field, regarding the draining of which he had spoken to him about twelve months ago. The drains in one part of it were 4 feet deep and 36 feet apart; in another part, 30 inches deep and 18 feet apart. He formerly mentioned to Mr. Smith that he thought the 4-feet drains were the most efficient; farther experience confirmed him in this opinion. A few days ago, when the whole country was drenched with drain, he directed his land-steward, a strong advocate for shallow drains, to inspect the two divisions of the field; and he reported that the side where the deep drains were was the driest; and when he himself afterwards inspected them, he found this to be very apparent. The ground there was dry and firm; while over the 30-inch drains it was soft, the soil being filled to the surface with water, like a sponge.

Mr. Campbell, of Craigie, said that he had begun draining by shallow drains 22 or 24 inches deep, placed in the furrow 15 or 16 feet apart; and in one instance, where the ground was flat and without furrows, only 12 feet apart. He did not find them efficient; and when placed so close to each other, the ground still remained marshy. He deepened each alternate drain to 3 feet, leaving 24 feet between the deepened drains: he considered the ground now quite dry. He treated a greater part of the ground drained at 15 or 16 feet in the same way, in general deepening each alternate drain; but in a few instances, where the subsoil was deep and unbroken by any foreign matter, he deepened each drain. He thought these drains had proved efficient, except, perhaps, in one field, deepened alternately, where there were stiff clay spots which still looked wet. He thought 3-feet drains, 30 feet apart, generally answered on his land. He had had no experience in draining 4 feet; but he had last autumn looked at a field of Mr. Ross, of Lesnesnock, with a gentleman present and the Gouernment inspector, where the drains were 4 feet deep, and 40 feet apart. It appeared dry, and bore an excellent crop of turnips.

Mr. Smith, of Deanston, said his proposition had always been thorough-draining, in whatever way it was to be accomplished; and he had laid down the mode which seemed to him, after much experience, most generally applicable to the soils of this country. The subsoils were very various, and to a certain extent required treatment suitable to their varying nature. He had the honour on a previous occasion of laying before the society his theory of thorough-draining, and therefore it was unnecessary that he should on this occasion repeat his views. He was not bigotted to any precise mode of operation, and therefore he was delighted to find anything which seemed to offer an improvement either as to efficiency or to cheapness; and

he gave all due heed to the statements regarding deep draining; but the test of a fair experiment by comparison was the only result he would depend upon; and so far as his observation and experience had led him during the last 40 years, his opinion was in favour of moderate depths and moderate distances; and he had invariably found that when drains were placed at great distances—say from 30 to 40 feet—there never was perfect dryness for a considerable period after rain, on the surface soil towards the middle, between the drains. It was not necessary for him to tell practical men how desirable it was to obviate this. The cutting of drains to the depth of from 3½ to 4 feet could hardly be accomplished at any cost in some of the subsoils in this country; and even in clay soils free from stones, the additional expense of deep cutting was considerable. Mr. Smith here referred to a table, in which the cost of drains at different distances and depths was estimated, and according to which, drains, at a distance of 21 feet, if 2 feet deep, would cost £3 17s. per acre; 2½ feet deep, £4 12s. 3d.; 3 feet deep, £5 12s. 3d.; and if 4 feet deep, and 42 feet apart, £4 1s. He was convinced that no experienced farmer would grudge the difference of 11s. 3d. between drains 2½ feet by 21, and those 4 feet by 42. He had never seen, in the whole of his experience, clay lands thoroughly dried with drains at 42 feet apart, however deep the drain. He was aware that when a bed of open sand or gravel extended under the whole surface of a field of clay soil, even at the depth of 4 or 5 feet, thorough dryness could be obtained by cutting deep enough to tap that bed. This might be accomplished with drains at even greater distances than 42 feet; but where there was a stiff tenacious subsoil of tile-clay or mortar drift, deep, wide-set drains were not applicable. He would wish to lay aside all theory, and confine himself to the test of actual comparative experiment. He had only lately been able to find a case of such a comparative experiment, which had been made upon a field on the estate of Sir Ralph Anstruther, in Fifeshire. The tenant preferred drains of 2½ feet deep, and about 18 feet apart; whilst the proprietor's opinion was in favour of 4 feet deep by 36 feet apart. It was agreed that the experiment should be tried by draining half of a field on the one system, and half on the other. The surface of the field had a moderate slope; and the drains were executed some time in the spring. The field was afterwards worked for turnips; and when he saw it, there was a good crop. There had been some rain for several days previous; and on the morning of the day on which the field was inspected, it had rained till nine o'clock. On that part of the field where the shallower and more frequent drains were, the ground was quite firm under foot, although a little moist on the immediate surface; the other half was found to be soft and wet, the foot sinking deeply into it, and on that part water was generally standing in the bottom of the furrows of the drills, where there was any hollow, indicating the saturated condition of the soil, and a much slower escape of the surface water than on the portion of the field where the shallower and nearer drains were. The outlets were so arranged as to discharge the water from an equal extent of surface on both portions of the field. He had no means of measuring the water being discharged; but it appeared to be pretty nearly equal from both outlets. The deeper drains would probably be carrying a portion of under water. It would be very important to watch this experiment further—the subsoil was a stiffish yellow clay. He had an opportunity of witnessing the effects of an experiment made on the estate of Coltness in Lanarkshire, where two drains, 4 feet deep and 36 feet apart, had been put down three years ago. The field had been in wheat last year, and the stubble was evidently much stronger near the drains; becoming weaker and thinner as it approached the middle point between them. The farmer stated that the land was always damp in the middle for a considerable time after rain had fallen. He had heard from an intelligent person of a similar result on a field drained in Surrey, where the dampness betwixt the drains was quite evident. He had never seen an instance of thorough draining by deep and distant drains; whilst all over the country land was to be found thoroughly dried from the effect of drains from 2 to 2½ feet deep, and from 18 to 20 feet apart. Indeed, he had never seen nor heard of a failure wherever drainage had been properly executed at such depths and distances. Disrepute had been brought upon the system in many instances by having the drains only 16 or 18 inches deep, and by bad execution with improper materials. The subject of deep draining was of vast importance; and he trusted that many comparative experiments would be made to test its merits, and he would willingly go a great distance to see an example of land thoroughly drained by deep drains at wide distances. An experiment had been made by Mr. Hope, Fentonbarns, in East Lothian, which went to show that better crops had been raised over the shallower than the deeper drains. The retention of a supply of moisture, at a distance not too great from the surface, Mr. Smith considered to be of importance for the growth of plants; the depth of 2½ to 3 feet appeared to afford a sufficient depth of soil for all working purposes, whilst the presence of water at that depth would afford moisture for the plants in dry seasons. In Lincolnshire, where

it is a flat country, they dam up the water in the ditches until it reaches within two feet of the surface; which in a dry season always insures a heavy crop. He considered that deep drains would not be so permanent as shallow, being more liable to be silted up.

Mr. Dickson, Saughton Mains, in reply to what had been stated by Mr. Smith, as regards the experiment at Balcaskie, which Mr. Smith had just commented on, and although the result there was in favour of the shallow and frequent system, could by no means allow that that experiment was a fair or conclusive one. The expense was nearly as £4 for the deep is to £6 for the shallow method. Had the same money, however, been expended on both, the 4 feet drains would have then been only 24 feet apart, when the result might have been very different. Besides, the deep drains had not had time to be fairly tested within six months of their completion; nor had the land been subsoiled or deeply worked after the draining. At the same time he did not think this was a suitable subject for draining at so great a width, being a very retentive subsoil. Speaking of subsoil ploughing, he might state that having taken the additional farm of Featherhall, he had drained since Martinmas last 80 acres of it; and with the exception of one field, where the outfall was deficient, the drains average 3½ feet deep and 30 feet apart. He had subsoiled to the depth of 16 inches as much of it as he could overtake in one season; and in this wet weather the difference of the state of the land which had been subsoiled, compared with that which had not, was very great, giving ample encouragement to go over the whole as soon as it could be done. The view taken by Mr. Smith of the permanency of the deep and shallow drains, viz., that the 4 feet drain will not be so permanent as the 2½ feet drain, on account of the likelihood of its being sooner filled up with sediment, appeared to him quite contrary to common sense and all former experience. His comparison of an open cutting and a covered drain was by no means a fair one, the action of the atmosphere on the one being quite different from the other. He did not pretend to discuss with him the theory of filtration; but it seemed clear that the deeper the subsoil is through which the water has to filter before reaching the drain, the more likely is that water to be pure and free of sediment; and, in point of fact, it was well known that in wet weather the water from shallow drains was frequently discoloured, when the water from deep drains was running quite pure, and he had often seen drains inoperative in this respect from being too shallow, but never from being too deep.

Mr. Smith said that he would endeavour to inspect the experiment at Chesterton referred to by Mr. Dickson. He was wedded to no particular system; but was anxious for comparative experiments, and when such were made, he would like to be informed of the results. Upwards of 20 years ago the society had offered a premium for thorough draining in the carse land in Perthshire, where the drains were fixed at 3 feet deep, and placed from 36 to 40 feet apart, being the width of the ridges there at that time. The land was very much improved thereby, but the tenant found it necessary, many years after, to put in a shallower drain betwixt every two, which effected a thorough dryness, and a stiff clay soil soon became a uniform turnip mould. Many more instances could be named of the conversion of a very stiff clay soil into a mould, which carried splendid crops of turnips.

Lord William Douglas said that the turnips on the field referred to at Balcaskie had been weighed, and he believed that the crop grown on the shallow-drained portion was about a third heavier than the other.

Mr. Campbell, of Auchindarroch, mentioned that he had instituted an experiment on a field of 2 acres, the subsoil of which was an impervious clay, one-half of which was drained 2½ feet deep by 16 feet apart, the other 4 feet deep by 21 feet apart. He had inspected them a few days ago; the water from the shallow drains was much discoloured, and was to a certain extent, he thought, carrying away the soil, while the water from the deep drains was as clear as crystal.

COLONIAL WOOL, &c.

It would be a work of supererogation to eke out a lengthened and elaborate argument to prove the immense value of the "sheep," whether as regards the supply of a description of meat most extensively consumed by the people of this country, and the great amount of agricultural labour employed in rearing and bringing the animal to market, the production of wool—a material of general use in clothing, entering extensively into various articles of domestic use, and the vast means of employment it affords to our manufacturing population, or lastly, although of no less importance, the peculiar properties possessed by its inestimable contribution to the comforts and necessities of man,

in communicating to the soil even by the contact of its body most valuable elements of fertilization. Although beef is considered to be the national dish, yet so strong is the predilection for the flesh of the sheep that it is assumed to be an article in universal use; hence the general mode of invitation to dinner—"Come and eat your mutton!" or, "Come and take a chop." Any information upon the management and productive powers of the sheep, and especially as regards the staple article wool, must be acceptable; and the more so if such information be derived from a competent source. The rapidity of communication which we now enjoy with the colonies, and their growing importance in supplying the mother country with wool, formerly procured in large quantities from foreign countries, render them objects of increasing interest not only to the public generally, but to the wool-growers of Great Britain. We feel, therefore, that in recommending to the attention of the British landowner and farmer, as well as to the general reader, a work on "Colonial Wool," by Mr. Southey, and published by Smith and Elder, Cornhill, we shall be doing acceptable service. If we had seen the sheets of this work before they were announced to the world, we should have suggested the comprehensive title of "Sheep and Wool," as better adapted to convey a more correct idea of the contents of the work. Mr. Southey having been long and intimately connected with the colonies, and especially with the colonial and foreign wool trade, is eminently qualified for the task he undertook; and the manner in which he has executed that task fully confirms his ability and fitness. Cotton for some time bid fair to supersede the use of wool; but, as Mr. Southey informs us, through improvements in machinery the latter is getting into more general use. The advanced price of cotton will stimulate human ingenuity to provide a substitute, and whence can such be more naturally or beneficially derived than by the use of an article which can be raised by our own people? Mr. Southey says, "In some instances sheep's wool is, in fact, superseding the use of cotton; and even muslins are made from it. So much has the consumption of light woollen textures increased, both at home and abroad, that our manufactures of this material have risen within the last few years to a surprising state of perfection, attended with a reduction in prices, evidently occasioned by more abundant supplies of wool, and the great assistance derived from machinery."

The increased consumption of foreign wool, and the progress made by the Colonies, will be seen from the following statement:—In 1816 the amount of foreign wool imported was 7,487,313 lbs., and from British possessions 29,563 lbs.; in 1836 the foreign was 57,817,493 lbs., and from British possessions 6,422,484 lbs.; in 1843 the foreign was 28,110,741 lbs., and from British possessions 21,132,352 lbs., an amount still annually increasing.

Mr. Southey says—"To feed our large and growing exportations of woollens, as before exhibited, and at the same time to meet the present demand, very large supplies of wool are wanted, and these we should either grow within the United Kingdom, or obtain them from our Colonies, in preference to foreign countries, when it shall be found practicable. It is estimated that within the British Isles there are at the present time no less than 40 millions of sheep, at an average of 4 lbs. per head, annually yielding 160,000,000 lbs. of wool, all which, in addition to 65,000,000 lbs., and in one year 75,000,000 lbs. of imported, our looms absorb; while many thousands amongst the working classes participate directly in the advantages arising from the employment which they thence derive." This statement will suffice to shew the great importance—nay, we would say the necessity—of encouraging, by all legitimate means, the growth of wool. Mr. Southey refers to the following observations of Professor Johnston in his valuable work on Agricultural Chemistry, and which being of direct and immediate interest to the practical farmer, we subjoin.

Professor Johnston says—"The growing of wool affords another beautiful illustration, both of the kind of food which animals require for particular purposes, and of the effect which a peculiar husbandry must strongly produce upon the soil. Wool and hair are distinguished from the fleshy parts of the animal by the large proportion of sulphur which they contain. Perfectly clean and dry wool contains about 5 per cent. of sulphur, or every 100 lbs. contain 5 lbs. The quantity as well as the quality of the wool yielded by a single sheep varies much with the breed, the climate, the cultivation, the food, and consequently with the soil on which the food is grown. The Hereford sheep, which are kept lean, and give the finest wool, yield only 1½ lbs., but a Merino often gives a fleece weighing 10 lbs. and 11 lbs., and sometimes as much as 12 lbs. The number of sheep in Great Britain and Ireland amounts to 30,000,000, and these yield 111,000,000 of pounds, or about 4 lbs. to the fleece. This quantity of wool contains 5,000,000 pounds of sulphur, which is, of course, all extracted from the soil. If we suppose this sulphur to exist in and to be extracted from the soil in the form of gypsum, then the plants which the sheep feed upon must *take out* from the soil, to produce the wool alone, 30,000,000 of pounds, or 13,000 tons of gypsum. Now, though the proportion of this gypsum lost by any one sheep-farm in a year is comparatively small, yet it is reasonable

to believe that, by the long growth of wool on hilly land, to which nothing is ever added, either by art or from natural sources, those grasses must gradually cease to grow in which sulphur most largely abounds, and which therefore favour the growth of wool. In other words, the produce of wool is likely to diminish, by lapse of time, when sulphur has for centuries been yearly carried off the land; and again, the produce is likely to be increased in amount when such land is dressed with gypsum, or other manure in which sulphur naturally exists." These observations may perhaps at first sight be deemed of too scientific a character to be practically useful; when, however, we reflect that daily experience proves the necessity of replacing those materials which plants *take out* of the soil, the scientific remarks of the Professo upon this subject will not be found inconsistent with the practical experience of others: the cases appear to us to be analogous. Mr. Southey has some valuable remarks under the head, "How to select Stock for Crossing." The main feature of the work is devoted to a history of the rise, progress, present state and future prospects of our colonies generally, as regards the growth of wool. Every man who desires to possess an accurate knowledge of the character of the sheep and its wool, as found in the various quarters of the globe, should carefully peruse this work. All who wish to obtain information as to the capabilities of production which our colonies possess, should consult its pages. We recommend it with confidence to our readers as a work from an examination of which they will get up with benefit and satisfaction.

ARTIFICIAL MANURES.

The following is the result of an experiment made by Mr. J. G. Cooper, of Blythburgh Lodge, near Wangford, Suffolk, by the application of manure prepared by Mr. Edward Packard, of Saxmundham, and which Mr. Cooper applied to his lands, which are of a light mixed soil character:—

SIR,—As promised, I herewith hand you the result of my application of bone dust and coprolithe for turnips, both of which were prepared with sulphuric acid, together with the cost attending the preparation of the same, and I will take them as No. 1 and No. 2.

No. 1.

Bone dust 4 bushels, or 184 lbs., at 3s. per bushel. .	£0	12	0
70 lbs. sulphuric acid (specific gravity 1.750), at 1½d. per lb.	0	8	9
70 lbs. boiling water, 9 bushels of burnt earth, and mixing	0	0	9
Cost per acre	£1	1	6

No. 2.

Coprolithe (in powder) 3 cwt. at 3s.	£0	9	0
168 lbs. of sulphuric acid, at 1½d.	0	14	0
Preparing and mixing coprolithe with acid	0	0	4
Manual labour in mixing the above with 9 bushels of burnt earth	0	0	2
Cost per acre	£1	3	6

Thus, you will observe, the manure No. 1 cost £1 1s. 6d. per acre, and the manure No. 2 cost £1 3s. 6d. per acre.

On the 10th of June, 1847, I drilled a piece of very fair mixed soil land with the manure No. 1, and Skirving's Swede Turnip seed, this I shall call A. And on the 3rd of July following, I drilled a piece of tender mixed soil land (which I shall call B) with the manures No. 1 and No. 2, and common white loaf turnip seed, applying the two sorts of manure separately from each other, and I drilled in several places on each of the pieces of land without any manure. Both fields had a good coat of farm-yard dung on the clover stubble, for the previous wheat crop. On the 24th of November last, I weighed a portion of the turnip crop on both pieces, selecting a fair average plant in all the experiments, and the following statement shows the result:—

	Description of root.	Weight per acre. Ton cwt. qrs. lbs.	Description of manure.	Weight increased. Ton cwt. qrs. lbs.	Artificial manure cost. Per acre.
Piece of land called A.	Skirving's Swede .	19 10 0 0	No. 1 ..	8 17 0 16	21s. 6d.
Part of do. ..	Ditto ..	10 12 3 12	Without manure.	0 0 0 0	nil.
Piece of land called B.	White loaf turnips.	14 14 1 4	No. 1 ..	8 18 2 8	21s. 6d.
Part of do. ..	Ditto ..	14 8 2 8	No. 2 ..	8 12 3 12	23s. 6d.
Other part..	Ditto ..	5 15 2 24	Without manure.	0 0 0 0	nil.

The produce on B from the manure No. 1 was only 5 cwt. 2 qrs. 24 lbs. beyond the land manured with No. 2, and the difference in cost was 2s. per acre in favour of No. 1. Although the produce in this case differed so very little, I beg to draw your attention to an important fact in addition to the extra outlay; viz., that the turnips grew much faster in their young state, from the No. 1 manure, than from the manure No. 2. The difference in the growth of the plants from the manure No. 1 was very perceptible for nearly three months, as com-

pared with those growing on the land where there was not any manure applied, and could be distinguished at the distance of nearly half a mile from the field. I drilled bone dust prepared with sulphuric acid last season on nearly 120 acres of land, and being so well satisfied with the result, I have bought bone dust and acid (as you are aware) sufficient for a similar quantity of land, which I intend to plant with turnips next season. I think it very important that the manure should be prepared on the premises where it is to be used, as such I will state my method of proceeding. I put 4 bushels, or 184 lbs. of bone dust, into a tub, then added 70 lbs. of boiling water, and stirred the bones well, so as to have every particle saturated; to this mixture I added 70 lbs. of sulphuric acid, and again well stirred up the ingredients to the bottom of the tub, covered it down close, and allowed the same to stand 24 hours; I then had 6 bushels of ashes from burnt earth laid down, the heap made hollow in the middle, into which the bones, &c. as previously mixed were placed, then stirred the whole up thoroughly and cast it aside on a heap—this altogether will measure 8½ bushels. I had 4 tubs at work, consequently mixed sufficient for 4 acres every day, which nearly found employment for a man and boy. I kept on mixing regularly till the whole was finished, and left it lying on two large heaps for six or eight weeks before using. When the manure was prepared for drilling, I had 8½ bushels of the above mixture measured from the large heap, an additional 3 bushels of burnt earth added, and all well stirred up together, thus making in all 11½ bushels of the mixture per acre. The tubs I have for steeping seed wheat were used on the occasion, and two pails marked so as to hold the proper weight of water and sulphuric acid—these, with an iron shovel for stirring, are all the utensils required.

The above is a faithful statement of the manner in which I applied bone dust and sulphuric acid for turnips last year, as also of the coprolithe manure, together with the result of my experiments, and you have my authority to communicate all the particulars to such parties as you may think proper.

I am, Sir, your obedient servant,

J. G. COOPER.

P.S. The bone manure was applied to several other pieces of land, and so far as the eye could decide, the result was equally satisfactory, but I did not test the produce by weighing.

The following is from Mr. James Cooper, of Hazlewood, who tested them :—

DEAR SIR,—Complying with your request to be informed of the result of my application of the superphosphate of lime for beet root, I beg to hand you the following statement of particulars. On a piece of heavy land of middling quality, I last year drilled red globe beet seed, together with 3 cwt. of manure previously mixed with about 10 bushels of burnt earth, and 5 of cinder ashes and saw dust, making in all 20 bushels per acre, at the same time leaving a stetch without manure. The cost and produce is calculated at per acre, and stand as follows :—

Manure.	Cost.	Produce. Ton.	Cwt.	Qrs.
8 cwt. of superphosphate of lime..	22s. 6d. ..	20	2	3
No manure	nothing. ..	9	3	1
	Increase......	10	19	2

I may add that where the manure was applied, the plants came up thicker, much stronger, and carried a remarkable superiority both in size and numbers throughout their growth. It is rather singular that on comparing the weight per bushel with some grown on light mixed soil land, I find these are the heaviest by seven pounds.

I remain, dear Sir, yours obediently,

JAMES COOPER.

PERIODICAL STOCK SALES.—We uuderstand that the monthly sale of horses, carriages, and agricultural stock, recently established at the repository, Cambridge, by Swan and Son, has been extraordinarily successful. A company of more than one thousand highly respectable persons attended one of the late sales at this provincial Tattersalls.

HOP DUTY FOR 1847.

From the Parliamentary Return relative to Hops, Malt, &c. The returns issued per Excise Office, in Nov., being incorrect, renders this official one more than usually interesting. Dated Feb. 15, 1848.

	Whole duty. £	s.	d.	Acres.	Lbs. weight.
Barnstaple ..	8	12	5¾	20½	986
Bedford				4	
Bristol......				4	
Cambridge ..	50	14	9¾	6	5,799
Canterbury ..	94,260	6	1½	10,839	10,772,681
Cornwall	1	12	11¾	2 8/100	188
Derby	20	7	6½	60½	2,329
Essex	1,777	5	8	214¼	203,119
Gloucester ..	1	17	11½	19	217
Grantham ..	8	3	7	26¾	935
Hants	4,672	4	11	1,838	533,984
Hereford	2,242	15	4¾	6,898	256,354
Hertford	306	19	6	39	35,083
Isle of Wight	8,001	16	4	1,218	914,499
Lincoln......	363	3	7¼	354¼	41,510
Lynn	60	4	4	17	6,882
Oxford	4	16	9¼	9	553
Reading	19	9	0	7½	2,223
Rochester....	180,802	5	2¾	16,981½	20,663,189
Salisbury	20	7	8¼	26½	2,330
Salop	3	11	0½	6	406
Stourbridge ..	87	11	2½	373½	10,009
Suffolk......	1,266	12	2½	159¾	144,756
Surrey	10	1	4¾	6¾	1,151
Sussex	100,576	11	2¾	11,876¼	11,494,541
Mid Wales ..	6	8	9¾	33	736
Worcester ..	349	2	5	1,287	39,905
Total....	394,923	2	2¼	52,327 58/100	45,134,365

	£	s.	d.
Old duty................	216,268	16	7¾
New....................	159,850	17	6¼
Additional	18,803	8	0¼
Total	£394,923	2	2¼

L. S. LYNE, Acct. General.

Excise Office, London, Feb. 11, 1848.

The pounds weight enables us accurately to calculate the old duty.

It is rather singular that at Bedford and Bristol there are four acres of hops in each, on which no duty is charged.

The Districts, Old Duty, Pounds Weight, and Average Growth per acre of Hops, extracted from the above return:—

Districts.	Old Duty. £ s. d.	Acres.	Weight. lbs.	Average growth per acre. cwts. qrs. lbs.
Rochester....	*99,011 2 3¼ 8-20	16,981½	20,663,189	12 0
Canterbury ..	51,619 1 11 12-10	10,839	10,772,681	9 3 12
Kent....	150,630 4 2½	27,820½	31,435,870	11 0 23
Sussex	55,078 0 2 12-20	11,876¾	11,494,541	9 2 11
Worcester....	1,471 1 2⅔ 8-20	8,591½	307,004	0 1 11
Farnham	6,951 16 2¾ 16-20	3,082½	1,450,813	4 2 19
Essex	1,694 13 9 8-20	380	353,674	9 0 26 }
North Clays..	214 10 10 8-20	441½	44,774	1 0 0 } 4 2 16
Kingdom	228 10 2¼ 8-20	135 33-100	47,689	3 2 0 }
Total....	216,268 16 7¾	52,327 58-100	45,134,365	8 2 6

Old duty.... 216,268 16 7¾ per parliamentary returns.
Ditto ...... 215,805 14 0¾ 4-20 per Excise Office returns.

463 2 6¾ 16-20 Error in first returns.

Acres of 1846 .... 51,948·4375
Ditto 1847 .... 52,327·58

†379·1425 Increase over last year.

March 8th, 1848. S. Plimpton, Jun.

* This is the largest duty Rochester ever paid.

† The increase in the plantation falls very far short of what it was generally estimated it would be.

MONKS KIRBY FARMER'S CLUB.—At the anniversary of the above club, it was resolved that four quarterly meetings should be held for the discussion of agricultural subjects. The first was held on the 14th of March, when a paper was read by Mr. Worthington, the chairman; the subject being—"What are the principal impediments to the improvement of British agriculture?" It was decided "that want of capital, want of farm buildings, want of agricultural education, small enclosures with excess of timber growing thereon, excess of game, and the want of security for capital invested in the soil, were some of the principal impediments." Mr. Worthington, and also the members who took part in the debate, laid the greatest stress upon the want of security for capital employed, urging at the same time the *necessity* of a tenant-right, as the only safeguard to both landlord and tenant.

HARLESTON FARMERS' CLUB.—At the meeting of the above club, held on the 23rd March, the subject for discussion being, "To consider what steps can be taken to improve the moral and social condition of the agricultural labourer," it was resolved unanimously "That it is the opinion of the Harleston Farmers' Club that little permanent improvement in the moral and social condition of the agricultural labourer can be effected by means of prizes and rewards, as has been attempted by agricultural associations in this kingdom, nor, indeed, by any measures that do not reach to the foundations and causes of their condition: it earnestly commends the study of this question to employers of agricultural labourers, and to all who have to do with them, and suggests that the required remedy can be hoped for only as the consequence of a right understanding, amongst these classes, of the position and claims of those who are almost wholly dependent on them: meanwhile, it advises attention to the structure of labouring men's cottages, and to all that can secure to them domestic conveniences, and that, where practicable, a garden should be attached to the cottage, in preference to an allotment at a distance; a careful revision and alteration of the general system of paying wages; an enlightened and liberal support of schools for the poor; and an urgent demand, addressed to the Legislature, for the repeal or reform (according to the necessity of the case) of all statutes which now bear so hardly upon the labouring classes, and especially for the immediate and unconditional removal of the hindrances to the possession and the exercise of their civil and political rights, which have hitherto been wrongfully withheld from them."

GREAT MORTALITY IN SHEEP STOCK.—We are very sorry to hear that very heavy losses have been sustained this spring, by many store masters, in the high-lying grounds in Barr, Colmonell, Kirkoswald, and other moorland districts, from the extensive deaths of sheep by rot—the proportion lost varying from one third to one fourth on some farms. This excessive mortality is attributed to the bad spring last year, and to the present unwholesome, changeable wet weather. It is considered that by such a mortality the rough market will be pretty good. The house of Muir and Appelby are the chief approaching markets for rough stock, that is grit ewes; they are held towards the end of the current month. Sales hitherto have paid wintering grit ewes £15 to £19, black faced and white faced wedders off turnips, and turnip ewes, from 25s. to 35s. each: the superabundance of turnips has been of great service—keep rating so low as 2½ to 4 per week; turnip sell at about 2s. per boll. But few lambs yet in this quarter, although a demmen one is dropped on different farms. Lambing not general till 1st proximo.—Ayr Advertiser.

SOCIETY OF FRIENDS.—Cultivation of the Land.—The following gratifying statements appear in a Mayo paper, the *Tyrawly Herald*. The example set by the Society of Friends, in this instance, is most valuable, as suggesting the most effectual mode of cultivating the land, and at the same time lessening the enormous burden of the poor-rate:—"Some time since we announced that the Society of Friends had taken several hundred acres of land in this neighbourhood for the purpose of cultivating them, and, at the same time, giving employment to the poor. Large numbers of persons are now at work upon those fields, and are earning, we understand, from 8d. to 10d. a day. If all the poor were thus employed we should soon have a reduction in the rate now levied for their support, and a beneficial change in the circumstances of the country would be soon effected."

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

The usual monthly meeting of the London Farmers' Club was held on Monday evening, March 6, at the club rooms, Blackfriars, W. Shaw, Esq., (of the Strand,) the Chairman for the year, presiding. The attendance was rather larger than usual. The subject appointed for discussion was: "The best mode of draining the strong clay soils and subsoils of this kingdom for surface water;" the introducer being Mr. W. Bullock Webster, of Hounsdown, Southampton.

The CHAIRMAN said: Gentlemen, it would amount almost to a truism if I were to say that the subject appointed for discussion this evening is a most important one. I believe we are all sufficiently satisfied that, whatever attempts you may make to cultivate land advantageously, whatever expenditure you may incur for manure or labour, still if it be saturated with water there is very little chance of a successful issue. Draining, therefore, is admitted on all hands to be necessary in the case of the great majority of the soils of this country. But a difference of opinion exists with respect to the proper depth of drainage. Some contend that the drains ought to be four or five feet deep; others contend that a depth of from two and a-half to three feet is sufficient. That is the question to be discussed to-night. It would be premature and improper on my part to offer any observations at this period of the proceedings. You will have an opportunity of hearing the opinions of men practised and experienced in these matters; and I shall reserve the few observations which I have to make until the close of the discussion, when I shall have had an opportunity of learning the sentiments of a body of men whose daily avocation and interest it is to prosecute such labours in the most satisfactory manner.

Mr. WEBSTER then rose and said: It is a well-known fact that every attention which can be paid to the preparation and application of manures will be ineffectual in rendering soil fertile unless due regard be given to the removal of excess of moisture by draining when needful. When a soil is saturated with water the air is excluded from the roots of the plants and prevented from acting upon the manure, while the low temperature produced by continual evaporation from the surface has an additional powerful effect in retarding the progress of vegetation. To lay manure upon wet soils is, in truth, to throw money away; but, were draining universally effected, the whole of the now comparatively unproductive soil of the country would, to a vast extent, be rendered capable of receiving benefit by various modes of fertilizing it. Its returns are immediate as well as compensative, and to hesitate to drain is to hesitate to confer a benefit upon oneself, of which the drainage of Lord Hatherton's property is a strong proof, as it pays a clear interest on the outlay of full 37 per cent. Having this evening to discuss the best mode of draining the strong clay soils and subsoils of this country for surface-water, I must not dwell on the great advantages to be derived from draining generally, but at once proceed to describe, first, what is meant by the strong clays, and then proceed to the various points connected with the subject, such as depth, distance, the fall, the best tile, &c., &c. I am quite aware that there are many persons who laugh at the idea of surface water, saying that if the water below is removed the top water is sure to take its place, considering that all subsoils have a superabundance of moisture that can be removed by draining. I completely dissent from this idea, and do not hesitate to state that in my opinion a great portion of this country, having clay subsoils, requires draining, not because the subsoil is full of water, but because the water does not enter the subsoil. On these soils the rain water that falls goes through that portion which is cultivated, and a part of the subsoil then meeting with a mass of retentive clay, stagnates, to the injury of the crops whatever they may be. There cannot be a doubt for one moment but that thousands of acres of land have been drained much too shallow, and that thousands of tiles of too large a diameter have been put in. Neither can there be any doubt that on porous soils deep drains, four to five feet, are better than shallow, as these drains draw faster, and fewer tiles are required per acre; and that on land wetted by springs, deep draining (even fifteen feet) is often requisite. But I think there is every proof that a system of deep draining (four and five feet), at wide intervals, on the very strong clay subsoils, for surface water, is a system that has been tried and found to fail years ago. Although thousands of acres of land have been ineffectually drained, yet has no one for this last fifty years succeeded? I am of opinion that it only requires a person to go over the various counties of England, as I have done, to be convinced that men of talent and judgment have devoted their time to the subject, and can show us how we ought to proceed. If we look back to the time of the Romans, we find that they adopted underdraining, but considered open ditches requisite on the strong clays. In the very earliest works we have on the subject of agriculture, although deep draining is recommended by the authors for springs, bogs, and porous soils, they invariably speak of not going so deep in clay soils, and placing the drains nearer together. For instance, look at "The Improver Improved," by Walter Blight. Elkington began his operations in 1764 (eighty-four years ago), and may be considered the first man who pointed out practically the true system of spring draining. Finding it so successful, he was induced to try deep draining on the strong clay subsoils. This was found entirely to fail, as is stated at page 137 of Johnston's work on the "Elkington System of Draining." "In soils that are so tenacious as to retain water on the surface till evaporation carries it off, such as are found in Sussex, Surrey, and many other

counties, this method of draining has been tried, and found entirely to fail." Throughout, this deep draining is condemned for surface water on strong clay subsoils. I have also arrived at this conclusion from personal observation, having examined the greater portion of the works executed by Elkington, and taken up drains on the very land around his own residence at Princethorp, in Warwickshire. Many drains put in under Elkington's direction for springs are still in existence, and working as well as ever, although in places they have failed from various causes—bad workmen, bad tiles, &c. Since the time of Elkington many works have been written on agriculture and draining, and not in one till the time when Mr. Parkes first went into Kent, in November, 1843 (previous to which time we must remember his attention had never been called to draining except as a mere casual observer; neither has he ever farmed, I believe) can I find a single instance of deep draining on strong clays being recommended. Since then much has been done, and we must inquire why and how it has succeeded. We now have to look into the facts that induced Mr. Parkes so strongly to advocate deep draining four feet on strong clay soils and subsoils, with one-inch once-cut pipes, which he says form the best known conduit for the parallel drains. First, Mr. Hammond, of Penshurst, is quoted by him as draining three feet in a uniform clay. Now Penshurst is just on the top of the Hastings sand, where the soil is known to be variable. What proof is this? Mr. Putland also only drained three feet. Mr. Thompson, of Woolver Farm near Ryegate, is also mentioned as having drained at three and four feet; but I have been over his land, and seen the draining in full operation, and do not hesitate to say it is a soil that will drain even four feet, because instead of the water being held near the surface, it is found in greater abundance at that depth. The soil being a clay, but the subsoil of a rather more porous nature, the water descends. I can state with the authority of Mr. Thompson, that on many points he differs most widely from Mr. Parkes, and that he would not put drains four feet deep if he found the water resting on a retentive impervious subsoil at three feet. Mr. Thompson does not like inch pipes; he does not advocate deep draining on all soils; and he has lately drained in Wales only two feet deep. On this subject I have received the following letters:—

"Hilden, Tonbridge, Kent, Feb. 18, 1847.

"Sir,—There is a difference of opinion as to the depth of draining the stiff soils of the Weald. Many experienced agriculturists contend that deep draining in every instance is the most effective; and I agree with them in part—but it is my opinion there are exceptions, particularly when the object is the removal of surface water. On many strong clay soils there is found under the clay gravel, and what is locally termed 'cats tail.' In such cases I think it necessary to go through the clay, and from my experience on the most tenacious clays, and those that are free from land springs, that 18 inches to 30 inches is deep enough.

"J. P. Charlton.

"W. B. Webster, Esq., Hounsdown, near Southampton."

The following refers to the Weald clay:—

"Staplehurst, Jan. 30, 1847.

"My dear Sir,—In reply to your favour of the 25th inst. I beg to say that the land in my occupation is for the most part very stiff, wet, and flat, consequently subjected frequently to serious injury from wet seasons; to obviate which I have been draining about two hundred acres on the farm upon which I reside, besides small quantities attended to elsewhere on my other farms, as well as some for others, perhaps altogether 300 acres more, nearly the whole of which has been drained on the clay soils of the Weald of Kent. I commenced draining 2½ feet deep, and found it answer my expectations fully: subsequent to this an opinion began to be entertained that deeper draining would be much better for our clays; many advocated and adopted it, some of which is said to be successful, although I must confess I have never myself been an eye witness of a *single case* in which deep draining has been successful upon *wet stiff clays*, although my employment as a land-agent and valuer gives me the greatest possible opportunities for observation. The general prevalence of the opinion induced me to go a little deeper than before; and in one field of between six and seven acres, at the earnest request of my deep-draining friends, I put in the drains near four feet deep, and two-and-a-half rods apart (33 feet) four years ago (this was 1843); this, in consequence of the stiffness of the soil, being nearly all strong clay, proved an entire failure, and I have this winter drained it again about 2½ feet deep, and am fully persuaded that depth, in lands like mine, is much the best, being wet from the rain that falls upon it, and not subject to springs. I have no doubt the water would after a time pass down to the deeper drains, but it would do great injury before doing so. I should recommend the deep drains upon porous soils, and land subject to springs; but on those soils in which there are no springs, which are wet from rain that falls on them only, and are not porous, it is next to madness, in my opinion, to drain them deep, say four or five feet, as some contend for. "Yours, &c.,

"William Barnes.

"Wm. Bullock Webster, Esq."

Mr. Thompson's land, as well as the land in other parts of Kent, has what is locally termed cats tails in the subsoil, which accounts for the four-feet drains answering there. Mr. John Taylor, of Mereworth, says in a letter to me, that he puts his drains five feet deep two rods apart, on the strong clays, and rams the clay on the tiles as light as possible. If this answers it must be very different soil from what we have in other parts even of Kent. Mr. Spencer, of Wrotham, in Kent, has also been quoted as a great advocate for deep draining on the strong clays. He has found it most successful on his farm; and why? because it is just at the dip of the chalk hills on the green-sand formation, where deep draining is almost always required. I have seen the whole of his farm, and do not hesitate to say it is land which I should drain deep. Two Somerset farmers living near Burleigh are also quoted by Mr. Parkes: in both cases the subsoil is stony. I have lived in Kent for years, and know many of the best farmers in the county; but I do not find any adopting this new system for surface water on the very strong clay subsoils except those quoted. But we must not forget the wonderful letter so often quoted, as convincing to anyone of the advantage of deep draining over a more shallow system, written by the Right Hon. Charles Arbuthnot to Mr. Parkes in

the Journal of the Royal Agricultural Society. Here we are told that two fields, containing seven acres, were attempted to be drained by shallow drains, but without effect. Drains four feet deep were then laid in the furrow across the shallow drains, and after the first shower the deep drains ran and the others did not—how could they? This so thoroughly convinced Mr. Arbuthnot of the efficacy of deep draining, that he is going to have his land all redrained, proving that it was never drained before. Mr. Parkes states Mr. Arbuthnot's soil to be a sound clay (see vol. 6, page 130). He also says that the subsoil contained clay, chalk, and flint. What is there in this statement to show that on the retentive clay subsoils of this country we ought to adopt this system? Now another point has to be taken into account: what has Mr. Parkes, or anyone who agrees with him, done since 1843 to convince us that his system is the best? At Sir R. Peel's the soil is full of underwater and requires deep draining. I have not, however, been able to find any one instance of the successful practice of this inch-pipe deep system. I have heard of several, but when I have been to see the actual state of things I find it very different from what was represented. Take the draining at Epsom. On the 30th October, 1846, I rode with E. H. Playford, Esq., of Ewell, to see the draining done by Mr. George Ede, miller, of Epsom Common. I was told that he had drained his clay land eight feet deep, and that it answered perfectly. On our arrival we soon found Mr. Ede, who told us that he had done a good deal of draining, and had found it to answer perfectly, but that he had not gone more than four and five feet deep, and then always filled up his drains with flint stones for one foot. The land was ploughed flat, and was very sound. He estimated the cost at almost £7 per acre. The flints were close by, and could be had for almost nothing. He had cut one drain about eight feet deep on a hill to cut off a spring. There had been shallower draining on this land, but it had proved not so good. The old Epsom salt springs are on his place, and the land dips from the common land. He says that pipes with clay on the top would never do, and that in his land the water enters from below. Mr. H. Davis states that he had drained all descriptions of soils, and found 4 feet deep and 35 yards apart answer. I wrote to ask him to show me a field of strong clay, and he sent me the following letter:—

"3, Frederick's Place, Old Jewry, London,
"Feb. 2, 1847.

"Sir,—In the 'Maidstone Gazette' paper of last Monday week, a report is given of a very able discussion on deep draining by the Weald of Kent farmers. I beg to refer you to it. We probably differ in our object in draining for agricultural purposes. Mine is to drain off the under water, which I consider so injurious: yours appears to be the surface water. I have so little time at command, you had better apply to Mr. Parkes, who has taken up the business of draining professionally. "I am, Sir,

"Your obedient servant,
"Hewitt Davis."

Mr. Mechi is another advocate, and I must show that he is wrong. In the first place I state without fear of contradiction that he has never drained a field of ten acres to the uniform depth of five feet with one-inch pipes, which he recommends to us; secondly, he himself allows that his wheat last year was quite as good on his shallow drained land as on his deep drained land; and in the next place he admits that he shall not be convinced so long as his inch pipes run at Tiptree Farm, and that the great advantage of deep draining is its cheapness. Mr. Morton, senior, is another advocate for going very deep on the clay; but when I tell you that he says he would put every drain a mile deep if it were not for the expense, I think I need say no more about him. People ask why, if this system be wrong, does the Royal Agricultural Society recommend it? Why do the government employ persons who adopt it? In the first place, the Council of the Agricultural Society state most positively that they do not recommend it, and Mr. Pusey, His Grace the Duke of Richmond, Lord Portman, and others whom I could name, are not advocates for it. They say that Mr. Parkes is only their mechanical engineer, and is not recommended in any way as a draining engineer. The government employed Mr. Parkes because he belonged to the Royal Agricultural Society of England; and if what he did proved a failure they would only have to say that they employed the engineer to the society, in order to get out of the scrape. No doubt there are many persons who will tell you that they have tried the deep draining on strong clays, and found it answer perfectly; but when you look into the facts, you will find, I think, that the depth is not beyond three feet. On this point let me read the following letter from Mr. Mason, of Tarrington, near Ledbury, dated January 28, 1847:—

"With reference to your request as to my opinion of the deep draining on our stiff clay soils, I beg to say that I have had much practical experience in draining such lands, formerly at five deep, very rarely less than four, but latterly two-and-a-half and three feet deep, with horse-shoe tiles and slate soles, forming a continuous bottom to the drain. I am fully convinced that in dense clay lands two-and-a-half to three feet is fully as deep as it is profitable to drain, and that a drain at a greater depth will not answer the purpose intended, to take away the surface water in the shortest possible time; when deep seated springs exist, the case is of course different. I have drained, with the best possible effect, land at two-and-a-half feet deep, which I had previously drained at five feet with only a partial effect. With respect to pipes of one-inch bore I would never use them, and as to pipes of a larger bore I consider horse-shoe tiles and slate-soles infinitely superior, unless as to the first cost."

I will also read the following:

"Evesham, Worcestershire, Jan. 31st, 1847.

"Dear Sir,—I have drained one field over again, owing to its being too deep; they are in from three to four feet; the land being strong stiff clay rendered them useless for surface water. The new drains I have put in about two feet, and well filled them with broken stone or burnt clay, which I find answer well. As to my sandy or porous soils, I prefer draining deep, but not with pipes of any kind, as I am satisfied they will never answer as well as the common tiles.

"Yours, &c., G. Bayless."

"To Wm. Bullock Webster, Esq., Houndown, near Southampton."

Remember that all draining does good, but the question is—What is the most effectual and the cheapest mode of making our retentive soils in such a state that *every* drop of rain water that falls shall be of service instead of doing injury? Certainly not to put in small pipes, and calculate the quantity of water that runs out of them in a given time. The great question is, in what state is our land for agricultural purposes? Deep drains will answer on a strong soil under certain circumstances. Before I proceed to the system which I recommend, I must point out a few more failures of the deep draining. In works on the agriculture of Scotland you will find it mentioned that it was the custom to go four and five feet deep, but of late years from two to three feet has been found better on the strong clays. The following letter from Worcestershire bears upon this point:

"Chadbury, near Evesham, Feb. 16th, 1847.

"DEAR SIR,—I can give you my opinion of draining clays for surface water in very few words: it is that I would not put in pipes one-and-a-half inch bore at a greater depth than three feet or less than two-and-a-half. This is the result of some experience. I firmly consider two-and-a-half feet sufficient.

"Yours, &c., C. RANDALL."

"Wm. Bullock Webster, Esq., Hounsdown, near Southampton."

One of the best agriculturists in the county of Norfolk writes as follows:

"Norfolk, July 30th, 1846.

"I cannot certify failures of pipes, although I know of such, because I cannot procure leave for the use of names, but am quite of your opinion that they will never answer, and not in this or that case, but I believe inch pipes will fail in *every* case; and my reason is this, independent from some others; from the small space by which the water is admitted into pipes, more especially small ones, the current must always be slow—so much so, that any soil admitted into the pipes will not scour out. For the same reason, they are more liable to have soil forced into them, because in the event of heavy falls of rain the water cannot obtain an entrance into the pipes so fast as it falls. It is true that in time the water may draw off; but the circumstance of the water accumulating about the drain to force itself in will tend to saturate and, as it were, dissolve the soil about the drain; and from the pressure of the water upon this dissolved soil, some particles (not a few) will be forced into the pipes, and the sluggish current before alluded to will allow them to be deposited in the drain, which, no doubt, is the cause of their failure. The reverse is the case with the double tiles, or a horse-shoe tile with a flat cover; they will admit any fall of water, however rapid, as fast as it falls, and the interstices, when caused by cracking, worms, or other causes, will remain clear open channels, through which the water will be admitted so rapidly that the drain will be scoured out upon every such occasion."

The very circumstance that will keep the double tiles open will choke the inch pipes; this has always been my opinion, and I think the above explanation demonstrates the fact.

"The sockets connecting the pipes make the case still stronger against them. I have within this last five and six years drained the most tenacious clay with the double tiles, at distances varying from 28 to 40 feet and from 28 to 48 inches in depth. I find 22½ feet wide and 30 inches deep a perfect drainage for the tenacious clays of our country—40 feet apart by 30 inches deep is a failure. I am certainly an advocate for deep draining in soil suited for it."

The following may prove convincing to any unprejudiced mind:

"You know that round all my heavy-land fields I have ditches from 3½ to 5 feet deep, and such ditches are general throughout the same land in Norfolk and Suffolk (on farms well cultivated), and they are generally kept clean with a free passage for the water. Still, we find it necessary, when our drains are parallel to these ditches, to make them not exceeding 22½ feet apart from them. I do not mean to say that if drains 3½ or 4 feet in depth were put 40 feet apart on these soils, the centre between the two would not be improved by them; I think it would, but certainly in a much less degree than if they were 22 feet and 30 inches in depth; and there would be another great objection on clays interspersed with flints and chalk boulder in the digging. I find that after 2½ feet of soil has been removed the next 14 or 16 inches have cost 6d. or 8d. per rod of 5½ yards, when very wet; this, of course was caused by the stones and the closeness of the clay. It is not at all uncommon to see a clay-pit stand with water within two feet of the surface, within from 3 to 6 yards of a four feet deep ditch. Where I have been draining four feet deep the subsoil is interspersed with sand pockets, and a much greater width between the drains may be allowed; but there can be no general rule—experience only can be the guide. Finally my great object in draining is not only to do it effectually but rapidly. You must in no instance be satisfied to have your subsoil saturated with water till your sluggish drains draw it off; it must go off as quickly as it falls, or your drainage will be neither effectual nor permanent."

What says old Mr. Jebbett, who made the Duke of Rutland's water-meadows?

"Mansfield, Nottinghamshire, Jan. 28, 1847.

"SIR,—The underdraining I have directed upon strong clay land, I have done it in various ways; but the *best* way I have adopted is to put in drains fourteen feet apart and two feet deep, with tiles two and a-half wide by three deep. The clay taken out of the drains is spread over the land. Some clays will draw eighteen to twenty-four yards apart, and from two to three feet deep. I have seen a great deal of good done by cutting deep drains where there are springs, at eight and ten feet deep. There is much land in this neighbourhood that cannot be laid dry unless the springs are removed. Yours, &c.,

(Signed) "THOMAS JEBBETT.

"P.S.—I have not put in any pipe-tiles, and if I did, I should like them not less than two inches diameter inside."

What is the opinion of Mr. Stephens, who wrote "The Book of the Farm"?

"Edinburgh, Feb. 5, 1847.

"DEAR SIR,—The best mode of draining strong clay land is yet a difficult problem to solve, though I own that inch-pipes placed at wide intervals, at six feet under the surface, is not the mode I should have hit upon to do so. I believe, however, that no single rule will apply to any case, and that *every* case ought to be judged of according to its own circumstances; and it is this condition, in my estimation, which makes draining truly an art, and places it out of the category of empirical practice. "Yours, &c.,

"HENRY STEPHENS.

"William Bullock Webster, Esq., &c., &c."

Mr. Sterling, of Glenbervie, who died last year, thus expressed himself;

" Glenbervie, near Falkirk, 1846.

" I do not believe that any less distance than sixteen and a-half feet will answer in such land, or that any increased depth will compensate for a greater distance between the drains." (His tiles were two inches by three inches.) " Smaller tiles may do, but I do not think the saving worth the risk.

" S. D. STERLING."

This is an extract from a letter of Mr. Dixon's, dated Feb. 2, 1847:

" The opinion which I expressed to you in 1845 in reference to these one-inch absurdities remains the same, as they are not safe for draining."

I would also read the following:

" Rivenhall Hall, near Witham, Jan. 26, 1847.

" SIR,—In answer to your letter for my opinion about the inch-pipes, I would not use them, as I consider they are not large enough. I have drained one field with one-and-a-half inch, but they are not large enough. The field being about thirty-five yards long, they run quite full. I consider the two-inch size the best size for general purposes, except for main drains, when I use double tiles. As for depth, I go from thirty inches to thirty-six inches, which I consider quite deep enough. Our soil is a chalky clay, about twenty per cent. of chalk. (Signed) " JONATHAN HUTLEY."

He then read letters from Mr. Stephenson, near Newcastle, and Mr. Moore, of Folkingham, Lincolnshire, in support of his views. If we go into Lincolnshire what do we find there? Thousands of acres of alluvial soil on so low a level that the water in many parts can only be taken away by mechanical means. I found there that on the strong clays of the higher ground deeper draining had been tried and found not to answer. In Shropshire I have been over thousands of acres, and found that there the same opinion prevails. Not long since I went over a large property near Coventry, the late Sir John Mordaunt's, and there I found much land requiring draining; a strong clay three to four feet thick resting on a dry sandy subsoil. Let me advise you to ask the gentleman who manages that property what is his opinion of inch pipes or four-feet deep draining on strong clays. When in that neighbourhood I heard that draining was being extensively executed on an estate in Coventry with one-inch pipes five and six feet deep on a strong clay soil for surface water. I called on Mr. Phillips, the owner of the property, and he most politely showed me all he had done; but I found that not one inch-pipe had been used, that the soil was not a strong clay, and that no drain had been put in above four feet. It was a soil that ought to be drained deep, and would drain well at wide intervals. There are many first-rate working drainers who have been engaged on the soil for the last forty years and more. Is the opinion of these men to pass for nothing? There is old Mr. Pearson, the spring drainer, in Essex; Cottam, the well-known drainer, in Yorkshire; and my old man Smith, who helped to make the Duke of Portland's water meadows, and has drained as much as any man living: and I can state most positively that these men all agree in condemning the present system of draining on the strong clay subsoils for surface water, but know the importance of going deep on porous soils, and where springs exist. But I have just remembered another gentleman who advocates deep draining even on the clays. Now although I am not personally acquainted with Mr. Wiggins, I know him to be a most talented and clever man. But where has he drained most? In Norfolk. He speaks of land and under-water, showing clearly that the soil which he has had mostly to contend with is very different from thousands of acres in other parts of England. In page 6 of his book he says that 100,000 two-and-a-half inch pipes are fitted up. This shows at any rate that he is not an advocate for one-inch pipes. How did Mr. Smith, of Deanston (who first forced upon the public the importance and advantage of thorough draining), bring his strong soils into such perfect cultivation? Why, by draining shallow. How have the strong clay soils in Dorsetshire, in Hampshire, in the midland counties, and in the north, been brought into their present state of cultivation? Go into any of these counties, and you will find that deep drains have been put in clay soil, but have been found not to do so much good as drains of a more moderate depth. The strong lands at Windsor have been brought into cultivation, not with inch-pipes at four and five feet deep, but with tiles at about thirty inches. In my own neighbourhood I could show any one deep drains in clay soils perfectly useless, while drains at a less depth are taking off the water; but as time will not allow me to go into the instances, I will now give you my opinion as to the best mode of draining the soils under our notice this evening. First there is the question of depth. This must be governed, in a great measure, by the nature of the land. After you have gone through that portion of the surface that is worked, you generally find a certain depth in the subsoil which is changed by its contact with the surface, and will crack; through this the water generally percolates. When you come to the strong impervious subsoil where the water stagnates, I contend that it is useless to go further, or to do more than is necessary to bring your tile or pipe in safety; but if it should so happen that this subsoil is within two feet of the surface, I would go to the depth of three feet, to allow of the other portion of the subsoil being ploughed and brought into cultivation by degrees. By this system you allow the rain-water to filter through the whole of your workable s and then to enter your drain—not, as it is said, to run off the surface into the drain at once. For regulating the depth of drains, it cannot be right to leave a body of water below, or to place your tile in the porous soil about the clay, which, however, has sometimes been done, and has caused thousands of tiles to be filled up. If the soil to be drained is a more porous brick earth I should advise that the drains should be deeper, as they will draw further. Now I contend that on the very strong clay subsoils the water does not enter the pipes in the way that Mr. Parkes states. "The water," he says, "first of all filters through the earth to the level of the bottom of the drain; it then travels horizontally until it reaches the little crevices which exist between each pair of pipes and enters into those crevices." How can this be the case on a very hilly field? It is my opinion that the water passes through the workable soil and the

upper and lower portion of the subsoil, and then into the drain. I have a railway cutting through my farm eighteen feet deep, and it dries no more land on either side of it than a three-feet drain. If a cutting of this size will not dry the land, or make it full of cracks, how can an inch-pipe do so? I have often gone into a tile-yard and seen the bank of strong clay full of cracks, after an exposure to the sun and wind for months; but, on cutting into the solid ground, I have never found the cracks go in more than two or three feet. The truth is, clay cracks from above, and we must be governed by the depth of our drains in clay soils, by the depth to which the clay is porous and inclined to crack, and not endeavour to make it so by placing one-inch pipes four or five feet deep and forty feet apart. What I condemn in laying down a rule of four feet is this, that there are many soils where, after you have gone thirty inches, you come to a hard callous clay or marl, which is dry, and of such a nature that the expense of cutting even six inches in it will be greater than that of taking out the upper thirty inches, and will do not the slightest good. There is a most important point connected with depth, to which I must call your attention, namely, the capillary attraction of which we have heard so much. I will state to you the results of an experiment which I made on that subject on the 4th of June, 1847. In order to ascertain to what height water would rise in various kinds of soil, I placed four six-inch pipes, three feet high, in a large iron pan, with about four inches of water at the bottom of it. One of these I filled with fine dry sand; in another I placed a sandy soil, manured, dry; in another, a strong loam, dry; in another, a strong clay, dry. Up to the beginning of July, I constantly watched the different earths, and, thinking that the earthen pipes the soils were placed in might have some effect in drawing up the moisture, I placed iron cylinders in their places. This I found made no difference. I then thought it fair to wet the whole of the earths, but they dried down to the same points again, thus—

No. 1, sand	at 24	inches,	just damp.
2, sandy soil ..	17	,,	,,
3, strong loam,	14	,,	,,
4, clay	15	,,	,,

Again, how is it that you always see the water in the ditches, going down into Essex, within a few feet of the surface, yet there are the finest crops of corn, roots and grass? I am quite convinced that you may over-drain grass-land (Hear, hear). This has been shown in the fens in Lincolnshire and in the marshes in Kent. I think capillary attraction is a beautiful design of nature to give nutriment to plants in time of drought, for it only acts then. Water coming from a higher level is often confounded with it, but it is in reality a very different thing. Next, there is the question of distance. This, like the depth, must be regulated by the draining properties of the soil. I am of opinion, from practical experience, that in a strong clay subsoil it will not do to go more than eight yards apart, whatever may be the depth of your drains. The late Mr. Stirling proved this. I think nearly all land will drain at eight yards, but I have no doubt that on very retentive clays six yards is much better; on the more porous clays (brick earth) nine and ten yards will answer. The great point, after all, in draining, is to do the work in such a way that it will be effectual, and make every drop of rain-water of value. It is after one or two wet seasons that the draining is tried (Hear, hear). Then is the time to go between the drains and see the state of the land. Since the inch-pipes came into use, we have not had a succession of wet years. Again, there is the direction of drains. This also is a point that must depend on the land, its situation, and other circumstances; but on a uniform tenacious clay, I am of opinion that rather across the fall is best. If you have a body of under-water to take away, or if the land be in alternate layers, it may then be desirable to go with the greatest fall. This is a subject on which people differ more than any other, simply from this cause: although, in their own individual cases, they may be right, yet exactly opposite results follow in other places. The great point in all draining is not to allow any water, if possible, to run off the surface; for if it once run over the surface it forms a kind of film, that prevents the free ingress to the rain. There is no doubt but that in most places the drains have not had enough fall, and have been choked from this cause. Mr. Beart's opinion as to the best depth is, that it is that to which the clay cracks from above. As to the size of the tile, Mr. Ogilvie, in his examination before the House of Lords, says—"I think the small pipes of an inch bore have not been sufficiently tried to warrant any one to say it is the best system of draining." Mr. Fisher Hobbs, who was also examined, says—"*I have had proof* sufficient to convince me that an inch-pipe will choke up." Mr. Dixon, of Witham, also stated that the practice of using small pipes has been given up, because they are inefficient. I have been informed that, in 1821, a considerable tract of Land in Sussex, called the Dicken, lying between Uckfield and Hareshall, was drained with inch-pipes; this has since been effectually drained with tiles thirty inches deep. I could give you a list of five hundred practical farmers who would not use them if they were offered to them for nothing: amongst these are Mr. Spencer, of Wrotham; Mr. Thompson, of Woolver Farm; Mr. Cottam, the drainer, in Yorkshire; and Mr. Smith, of Deanston, &c., &c., &c. There are persons, I am aware, who have used them with success, for the present. I have taken a few up myself that were buried in the year 1817, in Essex. They were made there, but not used to any extent; and in most cases they proved a failure. On some soils, if they are put in with the greatest care (though they may last a time), such is the evidence against them that they cannot but be condemned. It is now allowed by mos persons that nothing less than two-inch bore should ever be put in the land; and many contend that even that is not large enough. For surface-water, at moderate intervals between the drains, I think there can be no doubt but that a two-inch pipe is large enough; unless the drain is very long; in that case the size must be increased. In my various excursions through the country

I have always found that those persons who began with one inch have got to one inch and a-half; and that those who began with one inch and a-half have gone to two inches. The next point is the best shape of pipe or tile. If we start by saying that nothing less than a two-inch is to be used, I should strongly recommend the double tiles for many reasons. They come from the machine as pipes, and stack away in a similar manner on the hakes; they separate after drying; they go into the kiln in less space; they stand better; they are more easily handled; they do not allow the fire to draw through them so quickly; in the drain they have the advantage of the arch bottom to carry off sediment; there is a lateral opening for the water to enter, and for the air to act upon the soil; and if at any time you like to look into the drain you have only to take the top one off; you can also place them in the drain without getting in, through a simple invention of Lord Wenlock's. I have put in thousands of them for several years past, extending more than 700 miles; and I can with confidence recommend them. With regard to price, I can always manufacture them as cheap as pipes of the same diameter. At Lord John Scott's estate near Rugby they are made under my direction (coal being 15s. per ton) at 12s. per 1,000 pair, including every expense except the buildings. There are many objections to the various shaped pipes now in use; as, for example, the room which they take in the kiln, and the uncertain way they joint. The plan of collars is by many found very bad in practice. A word as to the material for filling in the drain. Clay has been recommended to be rammed on the tiles, in the *Royal Agricultural Society's Journal*, for two reasons; one, because nothing keeps the water out so well (and no water should enter from above); the other, because nothing lets it in so fast (as it cracks so freely). My opinion is that in draining strong clay subsoils it is a perfect proof that you do not go the proper depth if you return the clay on the tile. I consider that the tile should be safely buried in the strong subsoil, below the point where the water enters; and that a small quantity of earth should always be placed over it, or a grass sod is perhaps still better. Do not fancy that I want the water to run into my drain from the surface; but only to enter freely, after passing through the depth of soil required. I decidedly object to stones, bushes, or rough wood; as I consider that the finer particles of the soil are apt to wash through them, and to choak the drain. In the New Forest, at the present time, one inch pipes are being put in the land, with collars, at four feet deep, and thirty-five yards apart—*yards*, not feet—but on the pipes a large quantity of gorse or furze is placed, actually making a drain of itself. If Mr. Parkes's principle be right, that of the water entering from below; why do this? There are many points which I should have liked to have gone more fully into this evening. When we look at a geological map, and see the different soils of the country, how impossible it appears to lay down any rule! I have sketched out, in a rough way, the various formations on the surface; to show how absurd it is for any man to think that one system of draining will suit other places because it suits his. [He then exhibited a series of maps, showing the different kinds of soils in different parts of the country.] Only look at the Weald clay in Kent and Sussex. Why, there is not another formation like it. Then, again, the men who are always farming the new red sand-stone of Yorkshire have no idea of our London or plastic clays. Again, the drainer on the coal measures, although dealing with a tenacious soil, has much under-water to contend with; and another on the green sand formation must not fancy that all land has such springs as that. The very formation of clay from different rocks is so various, that the land must always be treated according to its own nature. I have been induced to express myself thus strongly this evening against the system of draining advocated by Mr. Parkes and Mr. Mechi, because I have seen the harm which it is doing through the country. Gentlemen in London, who are ignorant of the subject, read in the Journals of the Royal Agricultural Society of England, of Mr. Mechi's experience in deep draining, and of the ignorance of shallow drainers; of the percolation of the water through pipes, and of Mr. Mechi's having been invited to Sir Robert Peel's; of Mr. Parkes's being employed by the Government, and of the wonderful cheapness and effects of his system. They read that land can be drained at 16s. per acre at sixty-six feet apart, as stated by Mr. Pusey; and that even at twenty-two feet apart the whole expense is only £2 8s. And when they further read the statement of Mr. Hodge, the member for Kent, that inch pipes can be made for 4s. 6d. per 1,000, can we wonder at such men writing to their agents to adopt the system? I have had an order for 7,000,000 inch pipes, if I liked to make them; but I would not. The statements made with regard to tile-yards are only calculated to deceive. I reckon the inch pipes to cost about 6s. per 1,000. This price includes the interest of money at five per cent. for wear and tear of tilery. The interest alone on two tile-yards which I know will be about £50 a year; one in Devonshire having cost £1,000, and one in the Forest £1,500. You may depend upon it that it is a very serious thing for many an industrious, hard-working, tenant-farmer to have his land drained on this one inch pipe system. When it is done, he is charged with a per centage, varying from four to seven; and if after a few years the drains fail, who will suffer? The landlord will not like to have the land drained again, or to forego his per centage. Gentlemen, I thank you for your patience during the delivery of this imperfect address (cheers).

Mr. MECHI observed that Mr. Webster had not stated where Mr. Parkes's operations had failed. As they were being carried out on a large scale, he should be glad to have some information on that point.

The CHAIRMAN thought it would be better to put the question in a different form, "Where deep drainage had failed?" discarding altogether the individual opinions of Mr. Parkes, Mr. Smith of Deanston, and others, and dealing with the question simply as one between deep draining and shallow draining.

Mr. MECHI would take upon himself the responsiblity of saying on behalf of Mr. Parkes, that he had no objection to abide the proposed test.

The CHAIRMAN observed that to inquire where Mr. Parkes had failed, was in reality to ask where deep drainage had failed, and the latter question might be answered without reference to Mr. Parkes.

Mr. WEBSTER instanced the estate of Sir Robert Peel as one upon which Mr. Parkes's operations had been unsuccessful; and he also stated a case in Shropshire, in which they had also failed. In this latter instance, he visited the estate himself, after very heavy rains; and he was told that the drains in a particular field never ran at all, after one situated higher up had been drained.

The CHAIRMAN intimated that this kind of discussion was too desultory to be continued, and called upon the meeting to proceed to the discussion of the general question.

Mr. W. FISHER HOBBS said that after the remarks of Mr. Webster with regard to Mr. Parkes's proceedings at Tamworth, he felt called upon to make a few observations on that subject. Before the meeting of that evening, in consequence of contradictory statements, he (Mr. Hobbs) had felt it his duty to go down to the estate for the purpose of personally inspecting the drainage operations (Hear, hear), and through the kindness of Mr. Parkes he was enabled to fulfil his intention. He could not help observing that he was much surprised to hear from Mr. Webster that the character of the substratum there was porous, especially as he had admitted that evening that the tenacious clay on the table would make good tiles and pipes (Mr. Hobbs here exhibited some specimens of the Tamworth clay, in which, he said, drains 4 feet deep had been running at Sir Robert Peel's in the previous week). The clay which he saw was in fact as tenacious a clay as any man could desire for the purpose of draining. He admitted that immediately round the mansion, and in the park, there was a tract of light soil of the character which he had stated; but this did not prove that Mr. Parkes's system had failed on the estate. On one side of the stream where that system had not been acted upon, drains, laid by Mr. Smith, thirty inches in depth were scarcely running, though there had been an enormous flood; while on the other side the four feet drains were running as freely as possible. He went down not prejudiced either for or against Mr. Parkes's system. Perhaps if he had any leaning at all, it was rather against the deep drainage of four feet in strong clays, and in favour of the larger pipes. He must say that he was not yet a convert to the one-inch pipes, although he would concede to Mr. Parkes that a one-inch pipe with collars was fully equal to an inch and a-half pipe without collars. The admirable system of collars was superior to anything of the same kind that had yet been adopted. He would, however, read to the meeting a communication on this subject, which he had received that day from Mr. Parkes. Considering the subject one of vast importance to the practical farmers of the kingdom, as well as to landlords themselves, he had taken the liberty of inviting to this discussion Mr. Smith, of Deanston, who was a member of the club, and Mr. Parkes, who was not, to express their opinions. From the latter gentleman he had received the following:—

DEAR SIR,—My avocations will not permit me to accept the kind invitation of the London Farmers' Club to attend their sitting on Monday next, which you will be so good as to communicate to the meeting. I am really so much occupied from home, and so little at home, that I have no leisure to devote to discussion and disputation on drainage. I must refer inquirers on the system pursued by me to the thousands of acres I have drained during the past four years, and to the many more thousands now under hand, to tell their own tale. Deep drains speak a language far more intelligible and eloquent than I can pretend to utter, and the examination of a single example of this style of draining is worth more than a thousand lectures on the subject. I have long since ceased to discuss, and simply ask unprejudiced inquirers and prejudiced parties to go, see, and inform themselves. You have recently had the opportunity of inspecting some drainage of mine at Drayton Manor (Sir Robert Peel's), and at Twinstead, in Essex, on an estate of Lord Pomfret's; upon which drainages you will have formed your own opinion, and I will now reply to two queries you have put to me.

1st. As to the use of pipes of an inch bore or diameter; whether they are safe or unsafe.

I have not only had no reason to change my first opinion expressed on this point in the Journal of the Royal Agricultural Society (see paper on the influence of water on the temperature of soils, &c.), which was founded on fact and experiment, but it has been confirmed by large subsequent practice and experience, viz., that a line of pipes of one inch bore is fully equivalent to the conveyance of all the water of rain falling on a statute acre of land—springs, of course, excluded. I have found such pipes equal to this amount of duty, even in districts where from 40 to 50 inches of rain fall on the earth annually.

There are, however, some practical considerations of import to notice in the use of pipes of this small bore, and which compel the drainer's regard. It frequently happens that in free soils, highly charged with water, the quantity of water disgorged during the cutting of the drains is so great that inch pipes will not convey it away fast enough for the workmen to proceed; and such soils are often of a nature to cause the sides of the drains to fall in, if left open long enough to release the excess of water. In these cases larger pipes must be used than would ultimately be necessary, and such has been the general condition of the land you saw drained immediately about Drayton Manor, where I have necessarily used, for my parallel drains, pipes of $1\frac{1}{4}$ inch bore. We have there, however, drains of inch bore evacuating an acre of land, with little fall, which have never been more than three-fourths full at their outfall, after the heaviest and long continued rains.

The best proof I can offer of the sufficiency of the bore of an inch per acre is, that on calculating the collective area of discharge of my main pipes from many thousand acres of land, I do not find it exceed, on the average (always excepting cases of springs), a square inch per acre, which is about $\frac{1}{4}$ more than a circular inch; and it is better that the main or general receiving line of pipes should rather exceed than fall short of dimension. The rule, however, which I endeavour to follow is that which I originally laid down for my own government, viz., that the safest sized conduit to ensure constant free working, is that size which is just calculated to receive and pass the maximum volume of water which can at any time enter it. I like to see a drain, at times, run bore full: I then feel sure it is open throughout.

I never use inch pipes without collars, nor now, indeed, any other sized pipes up to 2 inch bore inclusive, where I have full command of the operations of drainage, and of a tilery to make the pipes. I consider an inch pipe collared to be fully

equal in its capacity of discharge to a pipe of 1½ inch bore not collared, in all those soils (and they are very numerous) where the bottoms of the drains cannot be scooped out for the pipes to fit exactly; and I consider the additional expense of the collar to be quite insignificant in comparison with the security which the collaring system gives to long lines of pipes against dislocation, derangement, or stoppage of any kind. In fact, I should decline being responsible, on many soils, for the success of a drainage, unless I could collar all my pipes up to 2 inch bore inclusive. Pipes of a larger size do not commonly require collaring, as they can be laid with sufficient exactness and firmness in the trenches, except in cases of running sands, when the collar renders all safe, and as permanent as if no such difficulty presented itself.

2ndly. As to the price of pipes, and of inch pipes particularly; whether the latter can be made and profitably sold at 10s. per thousand.

Neither you nor I can determine the market value and price of an article of any kind. This depends on the question of supply and demand, and nothing but competition brings price down to the lowest figure. In respect of inch pipes I have never been able to purchase any of a quality which I would use at 10s. per thousand, and I would not sell at that price. In fact, I rarely purchase inch pipes, as I rarely find them well enough made, or truly rolled, and straight. I use, however, considerable numbers of that size manufactured in tileries of my own mounting, or made by parties over whose workmanship I can exercise some control. The requirements of drainage on a large scale cause the practical man to look more to the price and means of diminishing the cost of the larger, rather than of the smallest sizes of drain-pipes. The continual discussion in newspapers &c., of the price of the smallest sizes, simply shows to parties well versed in the manufacture and use of pipes how little conversant such people are with the subject on which they preach. I am, my dear Sir, very faithfully yours, JOSIAH PARKES.

W. F. Hobbs, Esq., York Hotel.

Now he did not think it necessary to repeat at any length what he had witnessed on Sir Robert Peel's estate. He went over 1,500 acres of land which had been drained by Mr. Parkes within the last two years. The tenants paid Sir Robert Peel a per centage for the expense of draining. He believed Sir Robert charged them only four per cent. (Hear, hear); and so eager were they to have their land drained, that 70 men were then employed upon the work, and would probably continue to be so until the whole had been completed. So great was the benefit derived, that some of the tenants had informed him that even if they had to pay double or treble the present charge they would still be eager to purchase such an advantage. It was the four feet system of drainage that was in this case pursued. It was perfectly successful; the benefit was likely to be permanent; and great credit was justly due to Mr. Parkes. There was one thing which he saw during his visit, that had pleased him more than anything else, and that was the tile manufactory belonging to Mr. Hoskison. That gentleman had sent him some specimens of tilery which were superior, he thought, to anything of the kind that could be found in any other part of England. He was now making 60,000 per week, and had made three millions in one year of various sizes, from one inch to twelve inches. [The speaker here exhibited two specimens of pipes, one of which had been burnt to a dark brown colour, while the colour of the other was a decided red.] He saw no reason why many of themselves should not go to the expense of having a good tilery, where they could carry on a similar manufacture. It had been stated that Mr. Putland had not succeeded with deep drainage. He believed that that statement would not be borne out by facts. He had reason to believe that, from his own experience, that gentleman was now a decided advocate for a deeper system of drainage. He (Mr. Hobbs) had received a note from him, in which he thus expressed himself: "I first commenced drainage from 30 to 36 inches deep, with stones, straw, underwood, &c., to cover the tile; but I have abandoned that system for some time, and adopted the deeper system. The heavy rains we have had lately have given me ample opportunity of seeing the operation in the different fields. I find that where the drains are four feet deep, forty feet apart, with the strongest clay rammed closely over the tile, the water is discharged as from a filter; whilst in the adjoining fields the water from the shallow drains is discharged in a turbid state, and is carrying off some of my most valuable soils." Now this gentleman informed him that he had had 30 years' experience in the Weald of Sussex, and that within the last four years he had become convinced of the superiority of the deep system; such evidence appeared to him very convincing.

Mr. WEBSTER said he had himself advocated deep draining in reference to clays of that description.

Mr. HOBBS said there was one point in connection with draining to which he desired to direct special attention. They had heard of so many different opinions entertained by practical farmers on the subject of drainage, that he thought they ought to recommend the landed proprietors of England not to continue the system now too frequently adopted by them of finding for the tenant the tiles and pipes and then leaving him to perform the labour. That was a system which appeared to him injurious both to landlord and tenant. (Hear, hear.) If those gentlemen who called themselves draining engineers could not, with all their experience, agree as to what was the right system, he was quite sure that practical farmers throughout the country, who had had so little experience, particularly in reference to deep drainage, ought not to be entrusted with the execution of what was to be the foundation of an improved system of agriculture. The best plan was for the landlords to employ eminent men, like Mr. Parkes, pay them for the outlay, and then to charge the tenants a per centage. Three-fifths of the gross expense frequently consisted in labour; and he knew cases in his own county, in which tenants having undertaken the labour, had been sent by the agents of the property to a distance of eight or ten miles to purchase pipes, merely because they were one shilling or two shillings per thousand cheaper than in other places; and those pipes having been carted home, such was their condition, that in twelve months many had returned to their native clay. Such work ought always to be intrusted to competent

men, who for their own sake would take care to have a good article, and to perform their task in a sound and scientific manner. There was another reason why the plan he proposed would be an advantage. He would suppose the case of a farm of 200 acres. On entering upon possession the tenant found that 100 acres required drainage, and that the work could not be efficiently performed under an average of £5 per acre. Supposing the tenant to have £2000, a fourth of that amount would thus be swallowed up in drainage, and even if he only paid the labour £300 would be absorbed as a fixed capital in the improvement of the soil. On the other hand, if he paid his landlord 5 per cent for drainage—an amount which he thought about right as between man and man—he would only have to pay £25 yearly ; and though the landlord would be equally benefited, the tenant would have more capital to be employed in other beneficial improvements. He thought that was a point worthy of notice, both theoretically and practically. He would not trespass longer on the attention of the club. He would only say in conclusion that he was firmly convinced that four feet drainage on the strongest kind of clays was preferable to a less depth, and he challenged any one to mention any part of England in which, when a fair trial had been given to it, it had not succeeded.

Mr. Mechi said he should not on that occasion enter into any doubtful questions connected with the subject of drainage, nor should he attribute motives to any individual : his sole object would be to state a few facts connected with the subject under discussion (Hear, hear). He had drained 40 acres of very strong tile and brick clay 5 feet deep, and at distances varying from 33 to 50 feet between the drains. Those drains were running like pumps on the morning of that day, and they had always done so when more water had fallen than the land chose to retain by capillary attraction. He had also drained 100 acres of land on the old principle, with pipes at a depth of 30 inches, placed at distances of only 12 feet apart, and he had discovered that by such shallow and expensive draining he had thrown away a great deal of money. Mr. Webster had seen a crop of wheat grown on a field of 11 acres in extent which had been drained on the deep principle ; and he appealed to him whether he had seen finer wheat during this season than he saw in that field ? He paused for a reply.

Mr. Webster said he certainly had not. It was a splendid crop of wheat.

Mr. Mechi resumed : That land had certainly no intrinsic excellence to account for such a result. It was very barren, there was very little top soil, and in its undrained or shallow-drained state it produced unremunerating crops. From his own experience, he was perfectly satisfied that deep drainage in very tenacious clays, with one-inch pipes at moderate distances (say from 30 to 40 feet), would produce very excellent crops where such crops were never grown before. The land of which he had spoken had been previously in an undrained state, or, if drained at all, it was merely with the mole-plough ; and he found that whilst it remained in that original state, he was losing money every year. Since he had adopted deep draining the result had been very different ; and when he told them that the crop of wheat of which he had spoken yielded nearly 7 quarters per acre, he thought they would all admit that he was justified in what he had stated. He believed that the Chairman also had seen the crop.

The Chairman observed that he had, and that it was a very good one.

Mr. Mechi continued : Perhaps the most important consideration connected with deep drainage was one which had been introduced that evening—namely, the large quantity of earth which was thus placed at the disposal of the roots of plants. If a field were drained 30 inches deep, the soil at that depth was rendered available to the roots of plants. But if the drainage took place at the depth of five feet, there was a clear gain to the plants of 100 per cent. (Hear, hear). It must not be assumed that the roots of plants were satisfied with having merely cultivated soil : he had found practically that when a wheat-plant had reached the height of 3 or 4 feet on drained land, its roots had descended from 3 to 5 feet ; and he had heard of cases in which, where the land had been drained, the roots had descended much deeper. This he considered a most important question—namely, the depth of the soil placed at the disposal of the plants by deep drainage. There was one objection to shallow drainage which he considered especially forcible. They all knew that strong clay soils frequently cracked in dry summers to the depth of 4 feet.

Several gentlemen dissented from this statement, while others appeared to concur in it. One gentleman said he had seen such soils crack to the extent of four feet.

Mr. Mechi continued : He was speaking of undrained soils, and such soils, he repeated, cracked to the depth of four feet, or even more. This he stated confidently ; one of his men had observed that the cracks in the clay soil had extended to the depth of four feet after a dry summer, and that the soil had become wet through the water running down the cracks. Now these cracks acted most injuriously on the pipes placed near the surface. A neighbour of his own had been induced to place his pipes 20 inches below the surface. A dry summer ensued ; the cracks broke the pipes ; soon afterwards, a heavy rain was washed into the cracks, and reached the pipes, and the result was that the whole of the drainage was spoiled in the very first year after it was executed. That individual was now firmly convinced by his own experience of shallow draining, and by what he had seen on his (Mr. Mechi's) farm as the result of deep drainage, that the latter was the best and most profitable system. Farmers often talked of dense clays as if they were not porous. He would ask whether there was any clay whatever which, by atmospheric exposure, would not become dry, or which would not, through the action of moisture, become wet ? If there were, he had never seen it.

Mr. Webster did not concur in this view.

Mr. Mechi continued : If they burnt clay which was said to be dry, they would generally find

an enormous quantity of water carried off in the shape of steam. His experience taught him, in fact, that there were no clays which were not porous, and none which would not absorb water when in a dry state, or give it off when in a wet state, under atmospheric action. The forty acres which he had drained, at an average depth of four feet, had cost him from 30s. to 50s. per acre. The drains, which were 33 feet apart, 50s.; those 40 feet apart, 40s.; and those 50 feet apart, 30s. or 31s. The price paid for labour was 6d. per rod, no picking being allowed. Mr. Dickson was wiser than Mr. Webster; for, though he abused the pencil-cases, he had no objection to use them; and they cost him 12s. per thousand. In reference to pipes generally, he must say that their manufacture, as at present conducted, was a kind of primitive disgrace to the 19th century: they were neither well mixed, well pressed, nor well burnt. Any one who went into those parts of Staffordshire where pipes were made with the advantage of science and steam, and where wages were higher than in most of the agricultural districts, would come home satisfied that the pipe manufacturers of other districts neither supplied farmers with the article they wanted, nor made an adequate profit for themselves (Hear, hear). They had heard that deep drainage destroyed grass lands. Now, when a grass field was saturated with water, and had been so for centuries, there was a certain class of plants growing in that field which might be termed aquatic plants. He would not further define them; for they knew, to their sorrow, what those plants were; but, on deep draining that field, the proper food for those plants disappeared, and a better class of grasses not being found there, the result was that for a time there was no pasture. Let not the meeting, however, be led into the supposition that draining a grass field would ruin it. Let it be broken up and sown with better grasses, and then animals would be found to thrive upon it much better than upon vetch and other rubbish which sprung out of such soils. They were all, no doubt, aware that grass grew to a very great depth. He could assure them that, in various ditches, he had found it to the depth of four or five feet; and he could trace every concealed ditch by the superior luxuriancy of the grass above it. It was always found, in the case of a lawn, that if, in any particular point, the soil had been drained to a considerable depth, the appearance of the whole was spoilt, by the circumstance of the grass in that part being richer than in any other. He would ask the meeting whether they could grow good mangel wurzel, and other plants of that kind, on shallow-drained soils? He denied that it could be done. The want of depth in the soil prevented the perfect development of the plant. It was notorious, that the deeper the ground was drained, in dry weather, so much the longer would the plants continue to thrive. That was a fact which should never be lost sight of. It would be found that different fields, with different crops, would give down their water in different times. It was often observed that a clover ley would not run at all; while a fallow near it would give out volumes of water. According to the nature of the vegetation on the surface of the soil would be the early or late filtration of the soil. Open ditches, on strong clay soils, would not drain the soil of the adjoining land. A member of the club—Mr. Beadle—had told him the other day, in a conversation on this subject, that he had had a ditch which never used to run, except as a conduit for water from his neighbour's farm. He filled it up, putting some pipes and pieces of wood at the bottom; and, to his surprise, he found it the other morning running briskly with rain. He at once concluded that there was some water coming from his neighbour's farm. He went to see if it were so; it then became clear that that ditch was doing, as a closed ditch, what it had never done as an open one, viz. draining the adjoining soil. This was an important fact, showing, as it did, that the capillary attraction of a dry bank overcame the tendency of water to filtrate. When it arrived at the edge of the ditch, the water, instead of running further, absolutely acted in the same manner as water acted upon a piece of loaf sugar in a tea-cup. As an illustration of the principle, he would mention that a friend of his had a very excellent mackintosh, which was lined with a porous material. It was exposed to a heavy rain; and he was then quite surprised to find that the water, which had run down the outside of the mackintosh, had run up the inside, and had made him quite wet (laughter). That was an illustration of the effect of capillary attraction upon certain soils. There could be no doubt that the nearer a body of water was to the surface the greater would be the amount of capillary attraction, of evaporation, and of consequent coldness; because those rays of the sun which in the case of well-drained land were employed in warming the soil, were employed in the case of undrained or shallow drained lands in converting the water into steam, just as the same effect was witnessed in the case of the steam engine. They all knew that where vapour went off, that was the effect of heat. Undrained or shallow drained lands lost the benefit of the sun's rays, which were employed in converting its surplus water into steam. He was very glad that Mr. Hobbs had stated what he had done respecting the deep drainage on Sir Robert Peel's estate, as it would save him the trouble of saying anything on that subject. He would merely observe, that not only on Sir Robert Peel's property, but also in Herefordshire, whence he had just returned, and in other districts, he had seen large tracts of land drained on Mr. Parkes's plan—four feet deep drains, with collared pipes—and in no instance had the result failed to please those who had to pay the interest of the money expended in such drainage. He had seen a bill of 700*l.* for drainage of this description performed on Mr. Ricardo's property; and that gentleman's tenants told him that it was for them a most advantageous operation. They were not assembled on that occasion, however, to advocate any particular system of drainage (Hear, hear); he should be sorry to have any prejudice in favour of one system in preference to another, which was not founded on observation and fact. But any gentleman might satisfy himself by experience that deep drains would run five minutes before shallow ones, and also that they would run a day or two later. There was a great prejudice in favour of having plenty

of room for water. It was found that in a ditch, wherever the water was confined to a narrow space it cleansed everything, and caused the bottom to be clean; but where the stream expanded the water flowed differently, and there was a deposit of mud. The same effect took place in the case of rivers, ditches, and drains. One of the great causes of the failure of the old tile drains was this—that a body of water not bigger than a farthing rushlight was spread over a wide surface, and that which would have been a sharp flow of water in a small pipe was made a slow trickling stream in a large one. The result was, that a yellow ochrey matter was deposited by the water. Such was the operation of Mr. Smith's (of Deanston) pipes on Sir Robert Peel's estate (as was understood); and the effect was that those pipes were rendered perfectly useless. Under Mr. Parkes's system the matter was driven out of the mouth of the drain and deposited in the ditch. He would not take up any more time; but he hoped that if the farmers present wished to make money, they would not be misled by Mr. Webster, but follow the example of Mr. Parkes, and, if they pleased, of Mr. Mechi also, by draining deeply (laughter).

Mr. Bennett said he did not profess to be skilled in draining. For several years, however, he had tried it on as tenacious a clay as any in Bedfordshire, and the whole of it had been drained. As regarded the best kind of draining, his own feeling was that a great deal of good sense had emanated from Mr. Webster; he agreed with him that no positive and invariable rule could be laid down (Hear, hear). It was idle to say that all lands might be drained to the depth of five feet without reference to the nature of the soil. He had heard that even at Mr. Mechi's there was a considerable quantity of water standing in some of the furrows (laughter).

Mr. Mechi: Not on the deep-drained land.

Mr. Bennett confessed that having heard so much from Mr. Mechi in favour of the deep system, he had supposed that he had by that time quite exploded shallow draining, and got all perfect upon the broad system (laughter). He agreed with Mr. Webster that it was most mischievous for parties to go about declaring that it was only necessary for farmers to supply themselves with these pencil-cases, and to go to an immense depth, without inquiring whether the soil were suitable or not. The conclusion at which he had arrived after hearing that discussion was that in the case of very strong soils it would generally be safe to go three feet deep, putting the drains nearer than in other cases, and that in the case of porous soils they might advantageously go to a depth of five feet. Both the depth of the drains and the size of the pipes must be adapted to the nature of the soil to be drained; and any other principle than that must prove decidedly erroneous.

Mr. Franklin said he had farmed in Essex for about forty years, and he thought there was a great deal of truth in many of Mr. Mechi's observations. He could not agree with him, however, when he said that deep drains would run first, but he fully admitted that in the long run they would take off more water than shallow drains. From his own experience he had found that deep draining on clay lands was perfectly useless without subsequent subsoiling. He was convinced that those who attempted deep draining on clay lands would not succeed if they neglected subsoiling. He had a notion that every ditch which he made should be open at both ends. He took that as a rule; and he should be unwilling to drain deep if he could not act upon it. He knew that that could not be done in all cases; but in the case of every drain which he made, he eyed it out at both ends, feeling confident that the circulation of air, so necessary for the roots of the plants, would have a tendency both to draw the water down, and to make the plants grow.

Mr William Shaw, of Northampton, said that in his opinion deep draining was preferable, and that he was at present draining some of his ground at a depth of not less than four feet.

Mr. Fisher Hobbs wished to say, with respect to what had been stated about Mr. Parkes's system of drainage, that although he used small pipes of an inch or an inch and a quarter bore generally, still as he advanced he increased the size of the pipe to two-inch bore, following the principle on which the telescope was constructed; but although he thought the small pipe sufficient under ordinary circumstances, he did not lay it down as a rule that a larger one should not under any circumstances be resorted to.

Mr. Fulliger said that he had tried the deep drainage system on fat clay land. He commenced with 2½ or 3 feet, and as the distance increased he increased the depth of the drains to 3½ and 4 feet, with the drains 16 feet apart; and he must say that the deep drains dried the land sooner and more effectually. He had a piece of land in the London basin, where he had tried the system also; and he found that the deep drainage was the best there, when he could get the soil to carry the distance, but where that could not be got, he thought it was useless to attempt to go on with the deep drainage system. On his soil, which was a strong clay, he could not get drains done at 4 feet for less than 9d., but he could get the 30 inch drains done at 6d.; and where as he had observed, the soil could not be got to carry, he did not see why they should pay 9d. for doing that which could be better done for 6d.

Mr. Harvey said that he had had some experience in draining, and had paid considerable attention to the subject. He had read almost all that had appeared in the papers relating to it, and had heard the opinions of many practical farmers who had tried it; and he had long ago formed the opinion, which he still held, that deep and shallow drainage was a question precisely similar to thick or thin sowing of wheat. They must consider the nature of the soil, and be guided by that as to whether they drained deep or shallow. It was therefore impossible to lay down any general and arbitrary rule applicable to all soils and all circumstances; and all they could hope to effect by the discussion was, that they would throw out and receive useful hints with respect to the best mode of performing the drainage. Much would, of course, depend upon the tiles used in the drainage whether or not the drain would become deranged. If the tiles were the same

throughout, it was manifest that the drain must become deranged, since at the lower part of the drain a greater quantity of water would be passed through; and he would therefore recommend that where it was advisable to have an inch pipe at the upper part of the drain, they should have inch and a half pipe at the lower part. He had drained at 30 inches, and he could say that he would hardly wish for finer wheat than had sprung up; but at the same time he could not say that if he had drained deeper he might not have had a still better result: much must necessarily depend upon the nature of the soil, and other circumstances; and it was his opinion that shallow or deep draining must be regulated in the same way as thick or thin sowing.

Mr. NESBIT said that from what had been said in favour of deep and shallow drainage, he came to the conclusion that no rule could be laid down on the subject. Many who had tried the deep drainage had given their testimony in favour of that system, and others who had experienced the beneficial consequences of shallow draining advocated that mode. He had visited many parts of the country where both systems had been tried, and he found that there existed great difference of opinion as to which was the best system; and he was of opinion that in certain soils deep drainage answered best, while on others the shallow drainage ought to be adopted; for instance, Mr. Thompson, of Crich, had tried the deep drainage, and he found after a fair trial that it would not answer on his farm. With respect to what had fallen from Mr. Mechi, he did not think that that gentleman's practice on his own farm, and the mode in which the drains were made, justified the club in coming to any definite conclusion. As to the fact stated by Mr. Mechi with reference to the Mackintosh, that was easily accounted for in a very different way from that which had been stated. The moisture from the body evaporated in consequence of the heat, and the moisture of course ran down on the inside. The moisture did not come from without, but from within; and therefore Mr. Mechi's theory was fallacious. If they were to have a deep and shallow drain in the same field, it was quite certain that the deep drain would run first, and would drain off the shallow drain, and that the greater was the depth of the drain the greater would be the amount of water which would be taken off by it; if they could have five feet depth instead of three feet, of course it would be much better, but there were cases where that was impossible. He would suggest that they should come to a resolution to the effect that as soils differed in porosity no general rule could be laid down applicable to all soils.

Mr. WEBSTER said, in reply, that since he had addressed them, certain statements had been made by Mr. Hobbs respecting Mr. Putland and Sir Robert Peel, but with great deference he must still adhere to his original opinion. Mr. Mechi had given the meeting his experience on his own farm, but that experience was surely not to be set up as an example to be imitated by the farmers of England generally. His farm was only one of 170 acres, and it was easy to make experiments on such a farm, which could not be applied to larger ones. He had not said that grass land should not be drained at all, but that in many cases where that had been done the result was not satisfactory; and he contended that for all the objects which Mr. Mechi had in view by draining deeply, three feet was quite sufficient. A good deal had been said with respect to the want of proper tiles, and that it was extraordinary that steam had not been employed to make them; but he (Mr. Webster) contended that no steam engine whatever could make tiles near so well as they were made at present. On the whole he was of opinion that a depth of four feet in stiff clays was wrong, and that one-inch pipes were not the best that could be used.

The CHAIRMAN said that although the subject had been discussed with so much pertinacity by different speakers, he was afraid they should end where they began. He quite concurred with the opinion which had been expressed that deep or shallow draining must be regulated in the same way as thick or thin sowing, and that it was impossible to lay down any undeviating rule on one subject or the other. It was usual for the club to come to some resolution on the question discussed; but in the present case it was difficult to frame one which could be satisfactory to all. He had, however, prepared one, which he would submit to the meeting.

The following resolution was then read by the Chairman, and after a short conversation was, upon the motion of Mr. Bennett, agreed to.

"It having been satisfactorily shown to this meeting that both deep and shallow draining have been extensively practised with success, and instances having been adduced in which deep draining has succeeded after shallow draining has failed, and *vice versa*, and taking into consideration the diversified character of the soils, subsoils, and substrata of the land in this country: Resolved—That sufficient evidence has not been advanced to warrant the conclusion that any one uniform depth can be fixed for the drainage of soils of every description."

The CHAIRMAN said that before they separated he wished to call their attention to a subject of great interest and importance, but which did not form part of the business they had been discussing. They were all aware that the subject of Tenant-right, in which they were so much interested, was at present before the legislature; and he believed that Mr. Pusey was that very night to move a committee to take evidence upon it, and he was sure that the committee would gladly receive suggestions from men whose observation and experience entitled their opinions to weight and consideration.

Mr. MECHI proposed, and Mr. WEBSTER seconded, a vote of thanks to the Chairman for his able conduct in the chair, which was agreed to unanimously.

The CHAIRMAN returned thanks, and the meeting adjourned.

THE ROYAL AGRICULTURAL COLLEGE AT CIRENCESTER.—We are highly gratified to learn that twenty-three fresh students have entered this excellent institution at the commencement of the present session. The number of students is now seventy, and the council have so far succeeded in their indefatigable exertions as to make the institution self-supporting.—Devizes Gazette.

THE VETERINARY COLLEGE.

Sir,—I have to thank you for the insertion of two letters in the *Mark Lane Express*, and as I find the following editorial comment upon them — "The importance of veterinary science to the owners of cattle and horses in this kingdom is so great that, if the statements made by Mr. Henderson be correct, means must be taken to remedy the evil; the establishment of a second school, or college, would in all probability have the desired effect"—I take the liberty of again intruding on your space.

The statements I have made are simple matters of fact, and have existed so long that patience has at last become exhausted; if inquiry were but instituted, so much neglect and want of proper management would be found to exist in our veterinary school as scarcely would be *credited*. The consequences of this neglect have been brought so home to my feelings as a parent, with one son a veterinary surgeon, and another who will shortly have to commence his studies for the same, and finding that every effort that has been made to induce the proper authorities to remove or amend these evils has not been attended with success, I have addressed myself to you, in hopes that, by making the matter public, others better qualified may take such notice of them as to bring about a change for the better.

I have no wish for the establishment of another school, my object being to draw the attention of the parties who may have the control or management of the Veterinary College, towards the abuses and neglect existing.

The Veterinary College of London was established in the year 1791, and the circumstances were briefly as follow:—A society of noblemen and gentlemen, formed for the purpose of the encouragement of agriculture, and, from its place of meeting, called the "Odiham Society," somewhere about 1786 determined that a few young men of promise should be sent, at the expense of the society, to study the veterinary art, at the French Veterinary School, that having been established some years before. Just as these arrangements were about to be completed, M. Vial de St. Bel, a young French veterinarian of great promise, came to this country, and endeavoured to lay the foundation for a Veterinary College, but, after much negociation, failed; however, in 1789-90, he returned to this kingdom, and in consequence of his exertions, aided by the Odiham Society, and which merged itself into the new institution, the Veterinary College was established in the year 1791; the celebrated John Hunter, Mr. Cline, and other eminent medical and surgical practitioners, taking a warm interest in the institution.

M. V. de St. Bel was the first professor, and a synopsis for the routine study to be followed in the institution was laid down, and was as follows:—

1st course.... The Study of Zootomy.
2nd „ .... The Study of the exterior of the Horse.
3rd „ .... The Study of Operations.
4th „ .... The Study of Pharmacy.
5th „ .... The Study of Botany.
6th „ .... The Study of Shoeing and Pathology.
7th „ .... Attention to the Stables.
8th „ .... Epizootic Diseases.

But scarcely had the young institution begun to work, when its founder and professor unfortunately died, and a change in its system and management was the result, the course of instruction was abandoned, and only the diseases and structure of the horse were taught; nor was it till the year 1841 that any instruction upon cattle, sheep, or swine, was attempted; this was only brought about by a large annual grant of money from the Royal Agricultual Society—with what success your readers are aware from the report of the proceedings of that body, for which see the *Mark Lane Express* of the early part of the present year.

It does appear a most extraordinary circumstance that a company of gentlemen, professing to be procurators for the public good, and also having a considerable pecuniary interest in the welfare of our institution, should suffer the management to go on so blindly.

The Veterinary College of England ought to be a model to the world! What has it become? A degraded, neglected institution.

How is it to be expected that persons of good family and education should be at all anxious to enter an institution so managed as not to have a reading-room, or even shelter from the inclemency of the weather, save the stable or the gateway? Can we be surprised that many valuable hours are wasted in idleness, or, what is worse, spent in adjacent taverns? Even a police station now-a-days has its library and reading rooms, and every institution has more or less regard to the wants and comforts of those who frequent them.

About a twelvemonth ago, I took a journey purposely to look through the Agricultural School at Cirencester, having obtained a letter of introduction to Mr. Bowley. I was very kindly conducted through the building, and was truly delighted to find the regularity with which every department was conducted; the accommodation for the pupils was most complete. Independent of the spacious school room, I found many of the pupils engaged in study in small apartments, and I felt amply rewarded for the trouble and expense of my journey, for I saw that the means for instruction and the comfort of the student were combined.

I am quite aware that the accommodation at the St. Pancras School could not be brought into any thing like

the state of perfection of the one I have alluded to, nor do I think it necessary; still much might and ought to be done for the better instruction, greater comfort, and encouragement of the students, and I most earnestly hope that the governors of the Veterinary College will see that the best way of supporting their institution will be to study a little more the interests of those young men who enter there with the expectation of being sent out as useful and competent persons. If they would afford that personal attention so requisite, a great change, I feel certain, would soon ensue; but unless this be done that college must sink into insignificance; and should it be found necessary to establish another, as has been hinted, destruction to the old one must be the consequence. I remain, Sir, your obedient servant,

ALEX. HENDERSON.

26, *Cockspur Street, Feb.* 22, 1848.

—Mark Lane Express.

APPLICATION OF CHLOROFORM TO THE HORSE: ITS WONDERFUL AND GOOD EFFECT ON THAT NOBLE AND USEFUL ANIMAL.

SIR,—The following is an account of the experiments which I have made with chloroform: and if your consider it worthy a corner in your widely circulated Journal, it is quite at your disposal:—The Earl of Radnor having a hack mare which required to be fired for a weakness and relaxation of the muscles of her hocks, and as I was to perform the operation myself, from what I had heard and read of the effects of chloroform, I felt a desire to try it on this mare. I consulted his lordship about it, and he consented to my giving it a trial. His lordship had also a very old pony (not less than 30 years of age), and which had not been used for many years; she was badly broken-winded, and had been so, to my knowledge, for 15 years. I suggested to my lord that I should first try the effect of chloroform on this old pony, and his lordship thought with me, that it would be advisable to do so.

I selected a large piece of sponge, sufficiently wide to cover both nostrils, and on one side of the sponge I had a piece of bladder sewed, so as to be on the outside of the sponge when applied to the nostrils. On the 26th of January last, I had a good bed of straw made up in a large loose box; the pony was taken into the box with a halter on, by a man who remained to hold her head. I poured on the sponge two ounces of chloroform; I then held the sponge against the nostrils, and in about three minutes the chloroform had taken the desired effect: the animal began to stare and reel about till she fell down, when down she threw her head about a good deal, and moved her legs quickly for about half a minute, after which she became perfectly quiet; she lay for a quarter of an hour in this state of repose, during which period I several times pricked with a pin the inside of her ears, and she did not move a limb or a muscle; very shortly after this I again pricked her ear with the pin, when she shook her head and tried to get up; after which she again laid down for about five minutes, and at the expiration of that period got up and shook herself. I had some hay put before her, which she immediately began eating as if nothing had happened to her.

On the 1st of February, the mare to which I first alluded was taken into the large loose box, prepared as for the pony. She was thrown down with hobbles in the usual way for firing; when down, and the hobbles secured, I poured two ounces of chloroform on the sponge, and applied the sponge to her nostrils. In about two minutes it took the desired effect; she began staring and throwing her head about and struggling with her legs; she continued thus for about half a minute or so, and then became perfectly quiet. The irons and all things being ready, I commenced the operation: I fired her on the outside of one hock, and on the outside of one fetlock joint; and during the time I was doing this she did not move a limb. I then commenced inside the other hock; and when I had nearly done that part, she just moved her leg a little. I had a little more chloroform poured on the sponge, and it was again applied to the nostrils, and in about half a minute there were the same symptoms as at first, but of shorter duration. As soon as she was perfectly still as before, I finished the inside of the hock and fetlock joint; I then had her turned over, and resumed the operation, and had finished one hock all round except the last stroke or two, when she again moved her leg a little. I had the sponge again applied to the nostrils with a very little more chloroform poured on, and as soon as it had taken effect as before, I finished firing the other hock all round, and one fetlock joint, without her moving limb or muscle. The operation being now finished I had the hobbles taken off, and she lay very still for as long as ten minutes; I then gave her a pat with my hand, when she got up, and shook herself in a similar way that the old pony did, and did not appear any the worse or the least fatigued. As soon as she was on her legs she turned round, and went up to the manger: I had some hay put to her, which she began eating eagerly, and she has continued to eat well and do well ever since. She was about one hour undergoing the operation, and I used 3½ ounces of chloroform in the time.

Having been thus successful in the application of chloroform, and feeling satisfied that, if properly applied, similar operations might be performed without subjecting poor animals to the severe punishment consequent on them without the application of chloroform, and my Lord Radnor having expressed a wish that I would write a detailed account of these trials and the success which attended them, I have done so, and I feel that it is only my duty to endeavour to give them publicity. I am, Sir, yours obediently. JAMES COOPER,

Stud Groom to the Earl of Radnor.

Coleshill House, 9th February 1848.

—Reading Mercury.

REPORT OF THE IMPROVEMENT OF HOPTON MUIR, ROXBURGHSHIRE.

By William Thompson, Tenant.

[Premium, Ten Sovereigns.]

The farm of Hopton, in the parish of Ancrum and county of Roxburgh, contains 433 acres, whereof 221 have been long under cultivation, while the remaining 212 acres were in a waste natural state; though a considerable portion of it must have formerly been ploughed, as the form of ridges was quite distinct upon it when the improvements which I am about to communicate were commenced.

These lands were held on a lease that expired at Whitsunday 1842, at the annual rent of £200 sterling.

On new year's day previous, the offer made by the tenant, of £270 of yearly rent during a lease of nineteen years, was accepted, and full permission granted to him to improve, at his own expense, as much of the muir land as he should deem remunerative—he also being bound to divide and enclose all the divisions with suitable fences, and leave the whole in a tenantable condition at the end of his lease.

The farm offices are very conveniently situated for the land, and the east corner of the muir is very close upon them, and stretches to the west for more than 2,000 yards, with an average width of nearly 500 yards. The exposure is northerly, with a declivity very suitable for drains; and a large rivulet, with steep broken banks, flows along the bottom, at from 5 to 30 feet below any portion of the land ploughed.

Hopton Muir has been long divided into four parts; and now, when the land is under cultivation, these divisions are still retained.

For the sake of brevity, I shall designate these fields No. 1, No. 2, No. 3, and No. 4. No. 1 contains 71 acres, but only 24 of it are as yet improved: it is the most westerly, and separated from No. 2 by a turnpike road. No. 2 extends from that road eastward to a narrow stripe of old plantation, and contains 51 acres, whereof 46 are now improved: the remaining 5 being on the other side of the above-mentioned rivulet, thickly overgrown with whins, were left for a fox covert. While the *western* stripe of plantation is on the one side of No. 3, the *eastern* stripe is on the other, and separates it from No. 4, which is the most easterly division. No. 3 contains 48 acres, all of which are now cultivated but 3 acres, which have been left for the same reason and purpose as the five acres in No. 2. No. 4 contains 42 acres, whereof about one-half bore the first crop in 1846; the remainder to be ploughed in the ensuing winter. But in this report I intend confining myself to the other three divisions of the muir, containing altogether 115 acres of formerly waste land, now producing good crops, and, as I hope to show, profitably tilled.

In a report of this kind, an important question to be answered is, What was the value of the land previous to its being cultivated?

In December, 1841, before writing out his offer for the farm, the tenant asked a neighbour, of extensive experience as to the value both of arable and pasture land, to go over the ground with him, and state what he thought the whole was worth per annum. His valuation of the muir was 5s. per acre; and the tenant's own opinion, founded on his profits in former years, quite coincided with it; for on two occasions the muir was sublet at £50 a-year; and further, on looking over his accounts of money paid and received for ten or twelve scores of Cheviot lambs bought on the 12th of August, and sold unclipt on the 27th of June next year—and these were all the stock that the muir maintained, he found that his gains were from £40 to £55 per annum. So I think that 5s. per acre was the full yearly value of the land in question.

With respect to the nature of the soil, I fear that my statements will be found very deficient, from my ignorance of the properties of soil.

The whole of Hopton Muir rests upon a stiff clayey subsoil, at a depth of from four to eighteen inches below the surface. No. 1 had fully 6 acres covered with whins, and on being removed, a surface soil was exposed of very promising appearance. Some of it also was marshy and very wet, having in it a strong spring of water called the *Blind Well*, the water of which, on being taken in a covered drain to the farm onstead, a distance of 1,125 yards, and increased on its course by water from drains, now drives the thrashing machine. I may here mention, that not only has the water been brought in, but also a large pond made, a pit sunk, and the necessary machinery obtained for applying the water power, and the water restored to its original channel in a drain of nearly 700 yards in length, as required by a neighbouring proprietor,

all at the tenant's sole expense. The remainder of No. 1 was covered with small tufts of heather and coarse grass. No. 2 was the wettest division, and on it were the fewest whins; the dry parts were covered with particularly strong heather. No. 3 had been ploughed long ago, as it was all in wide ridges, highly raised in the middle and much bent at the lower end, while in general appearance it differed nothing from the others.

It is a circumstance well worth recording, that scarcely one large earth-fast stone was met with during the whole course of the improvements.

A very trifling expense has been incurred for fences, and that only in No. 1, where a paling of 822 yards in length was put up at a cost of 3d. per yard. No doubt open ditches have been cut along the sides of the different fields; but as they were chiefly intended for running drains into, I think that their cost should be given along with that of the other drains in the different fields. On the north and south are arable fields, and good fences have long existed between them and the muir. The road separating No. 1 from No. 2 has had a good turf wall on both sides for 20 years, so there remained only the two stripes of plantation requiring fences, and these were suitably done by the proprietor, his Grace the Duke of Roxburghe, when they were replanted at the request of the tenant.

Before the plough could be used, all the whins and heather had to be removed, and the land well drained. On a fine day fire was put to the rough grass, and with the assistance of the wind a whole field was speedily cleared. The half-burnt whins, or, as they are hereabouts called, *birns*, were afterwards hoed up, and done at an expense of £1 5s. per acre, as nearly as could be measured; and their value as firewood amply repaid the cost of removing them.

The necessity for draining land before commencing any other improvements is admitted by every one, and great attention was paid on the lands in question that this branch should be executed as perfectly, and at the same time as economically as possible.

Eight or nine years ago, a neighbouring farmer drained many acres of newly-improved land, at a very moderate cost, by a few cross drains judiciously placed between the *wet and the dry* parts of the fields; this plan answers the end very well where there is a spring of water rising up and wetting the surface lower down in the field; but at Hopton this plan could not be adopted, as there were few springs and only surface water, gathered in marshes, to be drained away. In staking off the drains, no plan was marked out and strictly adhered to. In No. 1 an open ditch was made round all the improved field, and most of the drains were cut at right angles to and opening into this ditch at the road side, but inside of the fence. In No. 2 the leading drains were placed parallel or nearly so to the plantation stripe, and the common ones entered them at a rather acute angle. In No. 3 a great number were made at right angles to and running into an open ditch, which was made nearly parallel to the rivulet; others emptied their water into the rivulet itself, and not a few opened into the long drain that flows into the thrashing machine pond; besides these, in all the fields many were cut whose position it is impossible for me to describe; it is sufficient to state that they went directly through the parts intended to be made dry, and entered the leading drains at nearly right angles.

The length of open ditches and drains made is as follows, in roods of six yards each:—In No. 1 are 274 roods of ditches, 140 roods of leading drains, and 553 roods of common drains. In No. 2, 45 and 96 roods of ditches on two sides, making in all 141 roods; of leading drains 249 roods, and 2,691 roods of common drains. In No. 3, on two sides, are ditches of 91 and 96 roods each, and at the lower end another of 27 roods, making 214 roods of ditches, 100 roods of leading drains, and 2,184 roods of common drains; making a total of 6,546 roods cut. The drains are generally made 10 yards apart; and the circumstance of there being so few roods for so many acres is explained by the fact that much of the land was perfectly dry, and drains would have been of no service.

No tiles were used in these three divisions of the muir; the drains being filled with freestone from a quarry discovered in the unimproved portion of No. 1.

Every thing connected with the drains was let, except the leading of the stones, which was done by the farm horses.

The ditches were made three feet wide at the top, sloping inwards to one half of that width at the bottom, and 18 inches deep, at a cost of 3½d. per rood.

The leading drains were cut three feet deep, at an average price of 5d. per rood, and the common ones 2½ feet deep, at 3½d. per rood. In all the drains the tough sod from the top was placed on the opposite side of the drain from the rest of the clay, and was afterwards put on the top of the stones, with the grassy side undermost, where it proved equally as good as straw for preventing any substances from getting down amongst the stones, and thereby stopping the flow of the water. The stones were easily obtained from the quarry, the earth above the rock being from 18 inches to six feet deep, which was removed, the stones taken

out, and also filled into the carts for 2½d. per rood for the three feet, and 2d. for the 2½ feet deep drains. The common drains received 14 inches of stones, and the leading ones were set or coupled thus:—Two flat stones were placed on their edges in the centre of the bottom of the drain, their upper edges resting against the sides of the drain; and then broken stones were put on the top, till the whole were 16 inches high in the drain.

The breaking of the stones to the size of a man's hand, filling them into the drains, and putting on the sod, were all let together for 1d. per rood: this sum was found to be too small, and a trifle extra was given as a present.

The leading of the stones cost 3d. per rood, estimating the work of a man and pair of horses at 8s. per day, as is common here. On adding all these items together, I find that the total cost of the leading drains has been 11½d., and of common ones 9½d. per rood.

These lands, being for continued tillage, under a 4 or 5 years' rotation of crops, much doubt was felt as to which would be the best and cheapest method of breaking up the land, and getting the tough sods out of the way. Paring, burning, and liming were recommended as the best way by some; while others spoke strongly against it, urging the expense and the risk of impoverishing the future crops, in order to increase the first and second: also on another farm now held by the tenant of Hopton, upwards of 30 years ago, 77 acres of muir were reclaimed; the lower parts were pared and burnt, while the higher were only ploughed. Forty acres of this land were in turnips in 1846; the lower end could scarcely be wrought from the quantity of tough sods on it, while there were none at the other end, thereby showing that in some instances paring is not a prevention of the growth of future sods. The soil is very thin, resting upon a strong moorband, and little difference appears in the crops between the two ends of the field; they are and have been alike poor.

Again, a neighbouring farmer, 8 or 10 years ago, improved about 270 acres, and pared none. After clearing the surface the plough was used, and now luxuriant crops grow on every field, and scarcely a sod is seen. From these circumstances it was determined to use the plough. During February 1842, the whins, &c., were removed from part of No. 1; and being quite dry on March 4th, four ploughs began, and in 5½ days turned over about 9 acres, which were all that were ploughed that spring. On March 31st, 9 bolls of Hopetoun oats were sown, and well harrowed, three pair harrowing 2 days on them. The return was 2 bolls per acre. Next spring these acres were limed at the rate of 128 bushels per acre, and afterwards sown with white globe turnips, which were a good crop, worth £5 per acre; some of them were manured with 15 cart-loads of good farm-yard dung per acre; some with 3 cwt. guano, and the remainder with 8 cubic yards of turf ashes, costing 1s. per yard, with 2 cwt. of guano above them; the last mentioned became the best crop, but to what extent is unknown, as none of them were weighed. Next year there was a very fine crop of barley, fully six bolls per acre; the next crop was hay, and in summer 1846 it was pastured. In 1843, the other 15 acres of this field were cleared, drained, and ploughed; the first crop of oats was very like that on the other part of the field; it was then limed, and a crop of Swedish turnips taken; they were valued at £7 per acre. The succeeding crop of barley was very good, fully equal to the other; it also was pastured during summer; the whole will be ploughed during winter, for the oat crop in 1847. In 1843, No. 3 also was broken up, and a similar crop of oats taken; then it was limed at the rate of 112 bushels per acre, and another oat crop taken, which was about five bolls per acre. In 1845 it grew a splendid crop of white turnips, but from there being a plentiful crop in the country, they were let for only £4 per acre; the manure used was 3 cwt. guano alone. A crop of barley was cut in 1846, of about 4½ bolls per acre. In 1844, No. 2 was ploughed, and after similar crops and liming to No. 3, it was in turnips in 1846, which had a very poor appearance, and were not worth more than £2 per acre—three cwt. of guano alone being their manure.

I may here mention that the first oat crop on No. 4 has now been cut, and seems to be about four bolls per acre—just double of what grew on any of the other divisions. Whether this has arisen from the superiority of the soil, or the season, or from its having got at least three times as much harrowing as any of the rest, or from the superior effect of tile-drains, which were here used, I cannot determine; but I intend carefully to note the future crops, and may make out a report of them.

In the following estimate of expenses I have taken 8s. per day as the value of the work of a man and pair of horses, which is our usual rate. In the crop of hay taken from No. 1, I have taken the rye-grass from it as paying the cutting and labour afterwards bestowed on the hay. In all the corn crops no account is taken of the straw and light corn—they are held as balancing the reaping and all future expenses. In measuring corn in this district, the boll of six bushels is always used, but I have taken the imperial standard.

Outlay on No. 1, containing 24 acres Imperial.

	£	s.	d.
Hoeing whins	8	0	0
Paling 822 yards, at 3d. per yard	10	5	6
Ditches, 274 roods, at 3½d. per rood	3	19	11
Drains, 140 roods, at 11½d.	6	14	2
——— 553 roods, at 9½d.	21	17	9½
Work till laid down in grass, £5 12s. per acre	134	8	0
Lime, £4 16s. per acre	116	4	0
Dung, 118 loads, at 5s. per load	29	10	0
Guano, 32 cwt., at 8s. 6d.	13	12	0
Turf ashes, 128 cubic yards, at 1s. per yard	6	8	0
1842—Seed oats, 6 qrs. 6 bush., at 21s. 4d. per qr.	7	4	0
1843— Do. 11 qrs. 2 bush., at 18s. 8d. per qr.	10	10	0
—— Turnip seed, 9 acres, at 2s. per acre	0	18	0
1844—Barley, 4 qrs. 4 bush., at 30s. 6d. per qr.	6	18	0
—— Turnip seed, swedes, 15 acres, at 2s. 6d.	2	17	6
1845—Barley, 7 qrs. 4 bush., at 28s. per qr.	10	10	0
—— Clover seeds, 24 acres, at 10s. per acre	12	0	0
Rent, 5 years, of 24 acres, at 5s. per acre per annum	30	0	0
	£430	16	10½

Return of No. 1.

1842—Oats, 13 qrs. 4 bush., at 18s. 8d. per qr.	£12	12	0		
1843— Do. 22 qrs. 4 bush., at 21s. 4d. per qr. ..	24	0	0		
—— Turnips, 9 acres, at £5	45	0	0		
1844—Barley, 40 qrs. 4 bush., at 26s. 6d. per qr. ..	54	0	0		
—— Swedish turnips, 15 acres, at £7	105	0	0		
1845—Hay, 9 acres, at £5	45	0	0		
—— Barley, 67 qrs. 4 bush. at 25s. 2d. per qr.	85	10	0		
1846—Grass, 24 acres, at 30s.	36	0	0		
				407	2 0
Excess of Outlay				£23	14 10½

Outlay on No. 2, containing 46 acres.

	£	s.	d.
Hoeing whins	£3	8	0
Ditches, 141 roods, at 3½d.	2	1	1½
Drains, 249 roods, at 11½d.	11	18	7½
——— 2,691 roods, at 9½d.	106	10	4½
Guano, 138 cwt., at 9s. per cwt	62	2	0
Lime, at £3 10s. per acre	161	0	0
Work, till the turnips were removed, at £4 10s. per acre	207	0	0
1844—Seed oats, 34 qrs. 4 bush., at 24s. per qr.	41	8	0
1845— Do. 34 qrs. 4 bush., at 22s. 6d. per qr.	39	2	0
1846—Turnip seed, at 1s. 6d per acre	3	9	0
Rent, 3 years, at 5s. per acre per annum	34	10	0
	£672	9	1½

Return from No. 2

1844—Oats, 69 qrs., at 22s. 6d. per qr.	£78	4	0		
1845— Do. 172 qrs. 4 bush., at 26s. 6d. per qr. ..	230	0	0		
1846—Turnips, £2 per acre	92	0	0		
				400	4 0
Excess of Outlay				£272	5 1½

Outlay on No. 3, containing 45 acres.

Hoing whins		£5	6 0
Ditches, 214 roods, at 3½d. per rood		3	2 5
Drains, 100 roods, at 11½d.		4	15 10
Do. 2184 do. 9½d.		86	9 0
Guano, 135 cwt., at 7s. 6d.		50	12 6
Lime, at £3 18s. 9d. per acre		177	3 9
Work, till laid down in grass, at £5 12s.		257	12 0
1843—Seed oats, 33 qrs. 6 bush., at 18s. 8d. per qr.		31	10 0
1844— Do. 33 qrs. 6 bush., at 24s. per qr.		40	10 0
1845—Turnip seed, at 2s. per acre		4	10 0
1846—Barley seed, 25 qrs., at 29s. 4d. per qr.		33	0 0
Clover seeds, at 10s. per acre		22	10 0
Rent, 4 years, at 5s. per acre per annum		45	0 0
	£762	1	6

Return from No. 3.

1843—Oats, 67 qrs. 4 bush., at 24s. per qr.	£81	0	0		
1844— Do. 168 qrs. 6 bush., at 22s. 6d. per qr. ..	191	5	0		
1845—Turnips, at £4 per acre	180	0	0		
1846—Barley, 151 qrs. 7 bush., at 38s. per qr.	288	11	3		
				740	16 3
Excess of Outlay				£21	5 3

In No. the Outlay exceeds the Returns by	£23	14	10½
In No. 2	272	5	1
In No. 3	21	5	3
Total excess	£317	5	3

I think there is little danger but that this excess of outlay will be not only repaid, but also a handsome profit realized by the improver during the currency of the lease.

The expense of working the new land under future rotations will not be greater than that of the old, while the crops are of more value, and the rent is much less; and, therefore, great encouragement is held out for the continuing of these improvements as long as there are waste acres capable of growing corn. And in this district all farmers, who speak from personal experience, state that the breaking up of muir land is the most remunerative investment of capital in land, where the soil presents no very great obstacles to its cultivation.—Transactions of the Highland Society.

EXPERIMENTS IN DEEP PLOUGHING AND DRAINING.

BY A FARMER.

No subjects connected with agriculture can be of so much importance to the farmer as ploughing and draining; yet there are none on which more opposite opinions have been expressed. It is unfortunate for all concerned that there are not even general rules, to say nothing about proper specific directions, as yet laid down, which can be depended upon, to guide those interested in the subject of the present paper: in this respect agriculture, though the oldest, is behind the most recently discovered occupations of mankind. Too many of those who have recently written on this subject have fallen into the serious error of finding fault with all who have ventured to pursue different methods to what had been found useful in their own limited locality; forgetting that the endless varieties of soils and subsoils can no more be managed by one system than all diseases can be cured by one medicine.

I am aware that the very outset of my experiments will meet with blame; but as every step I have taken has been the result of careful thought and observation, I do not hesitate to describe the system I have followed.

I. I find that my land is best drained by just putting the tiles *into* the clay; not as some do,

burying them three or four feet deep. I was induced to adopt this plan by observing that those deep drains which had been put in by my predecessor became yearly of less value for surface drainage; in fact, the water stood upon the very top of them. And I am induced to continue my comparatively shallow drainage, by observing—

1st. The water is quite clear as it comes from the drain, showing that it does not enter too rapidly.

2nd. There is not the slightest deposit of sand at the mouth of the drain; which proves to me that I am not endangered by soil washing into the drains, as the advocates for the present more fashionable deep-draining asserted would happen.

These two circumstances also decided my opinion against the use of pipe drains and collars, about which so much is now said. To me they are unnecessary. I have examined drains which had been laid upwards of twenty years with simple flange tiles, and found them as open as the day they were put in; the subsoil had not risen up and choked them, as one of the advocates for soles, collars, &c. &c. said would happen in half the above time.

I do not pretend to say that no drains should be put in deeper than mine; the depth of the drain must depend upon the subsoil; to drain effectually, in a porous soil, such as moss, gravel, or sand, you must get to the bottom of the water, whether that be two, three, five, or six feet. But my soil is not of any of these kinds: it is a hard, strong clay; in many places thirty feet deep, and contains no water. The evil which I had to contend with was the water which was always retained between the soil and subsoil. To carry off this, I have placed the draining tiles about one foot below the level of the plough, and covered them at the top with straw and the more porous surface soil. The distance at which I have placed them has been decided for me by the breadth of the old ridges; and as there is no observable difference between the drained and undrained furrow, it is evident that they are at least not too far apart, at twenty feet.

II. Having then decided the depth and distance of my drains, I shall now proceed to detail a series of experiments which were undertaken to discover the best method of after-cultivation by the plough:—

	1843	1844	1845	1846	1847
A. 5 acres drained and subsoiled	bare fallow.	wheat.	beans.	oats.	fallow.
B. 1 acre subsoiled	bare fallow.	wheat.	beans.	oats.	fallow.
C. 4 acres untouched	bare fallow.	wheat.	beans.	oats.	fallow.
D. 14 acres drained.....	bare fallow.	wheat.	hay.	oats.	fallow.
E. 10 acres drained and deep ploughed		bare fallow.	wheat.	hay.	oats.
F. 5 acres untouched		bare fallow.	wheat.	hay.	oats.

In the above table, I have endeavoured to show the design of my investigation; and having satisfied myself in this, as in draining, the experiments may prove useful to others as well as myself:—

1st. A portion was always left untouched, for the purpose of comparison—(as C and F).

2nd. So much was *drained alone*—(as D).

3rd. Another portion was *drained and ploughed* so as to bring about three inches of the subsoil to the surface. This was done by putting three horses into an ordinary plough—(as E).

4th. Five acres were drained and subsoil ploughed, by a four-horse plough following the common plough, and breaking about nine inches below the common plough, without bringing the subsoil to the top—(as A).

5th. One acre subsoiled alone—(as B). *

The drains cost in cutting &c. 6d. per rood, and averaged about 100 roods per acre, making the

* I did not try this experiment to the same extent as the others, having previously seen it fail on a neighbouring farm, where some scores of acres had been done.

total cost (including tiles at 25s. per 1000) about £4 per acre.

The subsoiling may be estimated as follows:—

	£	s.	d.
Two men at 2s. 6d. per day	0	5	0
Four horses at 2s.	0	8	0
Breakage, wear and tear, per day....	0	2	0
	0	15	0

Three quarters of an acre, equal to £1 per acre.

The deep ploughing with three horses can scarcely be considered an extra expense, as a wider furrow could be turned over at the same time with a deeper one.

The portions A, B, and C are so near as to afford safe subjects for comparison. Previous to 1843 the part A was in a miserable state—so full of water, that when it came in course to be fallowed, it was one mass of quickens and water grass; the portion C being always considered the best portion of the field. The average yield of the two parts (A and C) for four years previous to the experiment was as follows:—

	1839	1840	1841	1842
		Wheat.	Hay.	Oats.
A.	fallow.	20 bush.	16 cwt.	33 bush.
C.	fallow.	26 bush.	35 cwt.	44 bush.

After A had been furrow-drained &c., the produce was,

	1843	1844	1845	1846
		Wheat.	Beans.	Oats.
A.	fallow.	30 bush.	25 bush.	48 bush.
C.	fallow.	25 bush.	22 bush.	42 bush.

Another result of the subsoil ploughing, which perhaps more than the increased produce shows complete drainage, was that in 1844 the portion A was ripe about a week before C, and in 1847 the whole of the water grass had disappeared from it.

The portion B was a complete failure: I think it is, if possible, worse than before; the land has become like a sponge; it *holds* much more water than it did previously, and upon a strong soil and subsoil it is a failure.

The field D was in 1844 drained in precisely a similar manner as A, but not subsoiled. The increased produce, as compared with the previous years, has been—

Wheat	Three bushels per acre.
Hay	None.
Oats	Four bushels.

This increased produce, with the greater facility in working the land, will not justify any tenant in draining, unless it enables him to grow a green crop instead of a bare fallow.

The field E was drained like the above, and deep ploughed, as I have already described. I was quite unprepared for the results of this trial. I can scarcely say that I have improved the value of the field, though I have improved the produce as follows, as compared with previous years.

Wheat..	Three bushels per acre.
Hay....	Eight cwt.
Oats ..	No improvement except more straw.

The wheat was so dark coloured, that it was worth 1s. to 1s. 3d. per bushel less than D and F. I am quite at a loss how to explain this circumstance.

There was more water discharged from the drains in E, but not so much as in A; and there was about two cwt. per acre more straw in the oat crop of E, than in the undrained field F adjoining.

The deep ploughing evidently prevents the land from suffering from dry weather. All these benefits are unfortunately thrown away by the decreased value in the wheat crop; and I look forward with some anxiety to my future crops, hoping that this evil will be removed by time.

From these experiments I have laid down the following rules for my own guidance:—

1. Subsoil ploughing on undrained clay soils is useless, as the land soon returns to its original state.

2. Very deep ploughing is not at all advisable, unless I can prevent the injury to the wheat.

3. Furrow-draining is useful, but can only be recommended to the cultivator of strong, sound wheat soils, if he has a very long lease, or pays the landlord a per centage on the outlay.

4. I consider that portion of my land which is furrow-drained as only partially improved until subsoil-ploughed.

In conclusion, the only part of the preceding report on which I anticipate censure is the depth at which the drains are placed. Be this as it may, the method pursued is honestly stated, leaving it to others to profit by my experience.

C. E. D.

AGRICULTURAL CHEMISTRY.—TURNIP CULTURE.

BY J. B. LAWES.

Experience is a legitimate and trustworthy guide in all the great practical arts affecting the physical condition of the human race, and, for agriculture as for many other branches of industry, has attained a considerable degree of progress independently of the aid of science; but in so far as experience, as distinguished from principle, is relied upon, must we be content that the soundest practices should only be adopted by that small proportion of the entire masses who exercise an intelligent observation, and have arrived at rules for future guidance more or less by the lessons of past error. But although the results of investigation into the rationale of well-recognised practices should prove them to be in the main consistent with philosophy, rather than show them to be fundamentally erroneous, yet, when it is remembered that a well understood and simply explicable principle is much more easily acted upon, and by a much greater number of individuals, than are the dictates of the most acute empiricism, the claim of science as an improver, as well as an exponent of the economic arts, must be fully admitted. The young man of average talent and education, by the assistance of principle, attains comparatively early the position which otherwise half a life is spent in seeking. Granting, however, what we are by no means called upon to do, that the best practices of the age are beyond the aid of science, and that their more current adoption rather than their improvement is to be expected, a better knowledge than is now prevalent regarding the first principles of vegetable growth will serve to protect the farmer from the many snares into which either fraud or ignorance would lead him. If, then, the results of investigation should tend to explain and to enforce good old practices, rather than to put forth those which are new and untried, the utility or even the necessity of the application of science to the improvement of our national agriculture will not be the less evident.

The question with the agriculturist is not so much What are the constituents which must exist in the soil for the growth of a given amount of produce? but What constituents, or class of constituents, does this or that crop exhaust, relatively to another constituent or class of constituents? Looking at the subject in this point of view, we are of opinion that the increased growth of corn may be considered to have a very intimate relationship to the amount of nitrogen supplied to the soil; and since, owing to the scarcity and high price of ammoniacal salts, or other direct nitrogenous supplies, it is impossible to rely upon these sources, a rotation of crops, and the importation of food for stock, come to be not merely the only generally applicable, but the most economical means of restoring fertility to the soil. Under such a course for the special accumulation of nitrogen, it will be found that there is always secured an abundant coincident supply of mineral and carbonaceous substances, and hence the direct importation of these latter substances is seldom necessary.

The results of our experiments on wheat and other plants of the gramineous family have indeed shown, beyond a doubt, that the character of the exhaustion which the soil suffers by their growth is essentially and pre-eminently nitrogenous; and since common usage bears ample testimony to the efficiency of alternate cropping, it is to be supposed that an examination into the composition, habits, and sources of growth of the plants which enter into a rotation would bring to view important functional differences and peculiarities in the different plants, and such as should give confidence in general principles, and tend to improvement and economy in practice.

The greatly varying form and appearance of the various agricultural plants, implying, as undoubtedly they do, essential differences in their sources of nutriment, have led, from but superficial observation of them, to erroneous assumptions regarding the true office of certain plants in a course of agricultural cropping. Thus it is by some maintained that the large surface of leaf put forth to the atmosphere by the turnip, taken in connexion with the general character and utility of the crop, bespeaks an almost exclusive reliance upon the natural resources of the atmosphere for its carbonaceous supply; and the direct application of nitrogenous manures has accordingly been recommended with the view of favouring to the greatest extent the development of leaf as a means of securing bulb.

Again, agricultural plants have been arranged according to their botanical alliances; and distinctions between the necessary conditions of artificial supply of certain constituents have been made, which are inconsistent with the dictates of experience, and equally so with those to which we are led when other circumstances besides the

(nevertheless important) botanical distinctions are brought into consideration. The varying quantitative reliance upon the atmosphere and the soil, of different natural families of plants, constitutes indeed a most interesting and important point of study, and the principles upon which the *natural system* is founded may derive essential confirmation from chemical researches; but in referring the varying agricultural value of different plants to the functional characters of the several natural orders to which they belong, it must always be first decided that the natural aim and tendency of the plant and order are favoured by our methods and objects of cultivation, and that the agricultural value of the plant is in no way dependent on a monstrous or artificial development, at variance with that of its individual health and reproductive tendencies.

The cultivation, habit, and use of the turnip are well suited to form a contrast to those of our grain crops; and the plant itself may, to some extent, be taken as the type of the green or fallow crops, a main effect of which is the preparation of the soil for the aftergrowth of corn. The essentially artificial condition which is induced in the cultivation of the turnip plant, for feeding and manuring purposes, is most strikingly illustrated by the effect of climate and manures upon the quantity and composition of the produce.

We shall now proceed to discuss in detail the results of experiments which have been in progress in the field and in the laboratory for several years, and which were undertaken with the view of elucidating some of the general effects of rotation. From the commencement of the inquiry it has been our wish to avoid, as far as possible, the bias of any of the conflicting opinions which have of late years been put forth upon the important subject under examination, and it will be our endeavour, as we proceed in our report, impartially to lay before our readers such results of direct experiments as will enable them to form their own estimate of the soundness of any views which we may advocate or adopt.

At the outset, however, it may be well to caution the agriculturist against expecting what we by no means presume to exhibit. The object of the experiments has not been the production of immense crops, but to trace, as far as we were able, the real conditions of growth required by the turnip, and to distinguish these from those of the crops to which it is to a great extent subservient. To attain our object it will be necessary to speak of amounts of produce which may at first sight excite the ridicule of those who do not fully appreciate the nature of the question at issue; but those who choose to go through the details which we are about to quote will, it is thought, find that a true understanding of them tends much to explain the principles upon which the best agriculture is founded.

Before entering upon a consideration of the turnip results themselves, we shall remind the reader of some of the leading facts which may be assumed, regarding the conditions of growth of the wheat plant.

In the paper on "Agricultural Chemistry" in the last number of this Journal, a series of experiments was quoted for the purpose of showing the effect of season and manuring upon the growth of wheat; and a careful consideration of them led to some very important conclusion regarding the nature of the exhaustion by corn-cropping, and also as to the varying nutritive and marketable value of specimens of grain, having different characters and composition, traceable to known conditions of growth.

It was seen that the varying quantity and the quality of the produce of a plot of land, unmanured during several successive seasons, were materially dependent upon the number of rainy days, the inches of rain, and the temperature, of the months of May, June, July, and August, during which periods the accumulative and elaborative processes of the wheat plant are most actively determined. The average annual produce of the soil and season, unaided by manure, amounted to about three-fourths of the estimated yield of the neighbourhood under ordinary cultivation—to two-thirds of that of a plot manured by farm-yard dung—and to fully half as much as might be expected from as high a course of farming as the soil and the climate with which we have to deal would justify us in adopting. It is remarkable too that, whilst the quality of this natural produce, as indicated by the relation of corn to straw, and the weight per bushel of the corn, varied year by year according to season, yet the characters of the crops grown by very various and, in some cases, rather high manures, were for each season somewhat similar to those of the produce of the unmanured plot. It is evident, then, that the conditions favourable to an increased growth of wheat are perfectly consistent in *kind* with the natural tendencies of the plant, and that they only differ *quantitatively* from the natural resources of soil and season, and less indeed in this respect than might have been supposed.

The following table exhibits the influence of season upon the produce of turnip-bulb unaided by the supply of manure. The soil upon which the experiments were conducted was a somewhat heavy loam, not well suited for turnips; the previous crops since manure having been wheat, clover, wheat:—

Season.	No manure. Bulbs per acre, in				Average weight of bulbs, in lbs. and tenths.
	Tons.	cwts.	qrs.	lbs.	
1843	4	3	3	2	0·52
1844	2	4	1	0	0·36
1845	0	13	2	24	0·11

It is seen that in three years the produce of this unmanured plot was reduced from 4¼ tons to 13½ cwt. per acre; in the fourth season (1846) the bulbs only averaged the size of a radish, and were considered to be not worth weighing. This result strikes us as the more remarkable when we reflect that to the turnip is attributed a power of reliance upon the atmosphere for its organic constituents, to which it is supposed is due its efficacy in restoring fertility to the soil, and increasing the aftergrowth of corn, which itself attains to a moderate crop under the influence of soil and season alone. The evidence here afforded of the totally artificial conditions which are induced in the cultivation of the turnip for feeding and manuring purposes, is of the clearest kind; and we shall have occasion further on to refer to other points than those here given, as illustrating so curious a result.

Our present object is to show the entire absence of any beneficial influence of season upon the growth of the turnip, independently of artificial supply of constituents. An inspection of the two tollowing tables, giving the results obtained by various manures during three seasons, and the characters of the seasons themselves, affords some insight into the general influence of climate upon the growth of the *cultivated* turnip. It must be admitted, however, that the relation is by no means so quantitatively definite as in the case of wheat; whilst the conditions suited to the favourable growth of the two plants are very opposite in kind:—

Season	Bulb per Acre, in tons, cwts., qrs., and lbs.												Average weight of Bulbs in lbs. and tenths.		
	12 Tons Farm-yard dung.				Superphosphate of lime.				Mixed earthy and alkaline Phosphates and Sulphates.				12 Tons farm yard dung.	Super-phosphate of Lime.	Mixed earthy & alkaline phos-phates & Sulphates
	Tons.	cwts.	qrs.	lbs.	Tons.	cwts.	qrs.	lbs.	Tons.	cwts.	qrs.	lbs.			
1843	9	9	2	9	12	3	2	8	11	17	2	0	1·36	1·47	1·35
1844	10	15	1	0	7	14	3	0	5	13	2	0	1·19	0·81	0·68
1845	17	0	3	6	12	13	3	12	12	12	2	8	1·61	1·17	1·16

A detailed consideration of the produce of the several seasons under different conditions of manuring, as just given, cannot fail to show in which were the climatic influences most favourable to the growth of the cultivated turnip. It will be remembered that, without manure, the produce of the first of the three seasons was much below the most meagre agricultural amount; and that in the third and fourth it dwindled to almost nothing. This table, on the other hand, shows that under a course of manuring the third season yielded the largest crop, and the second invariably the least. The average produce of the first season, where farmyard-dung is employed, is not superior to that of the second season under similar conditions of supply, though it is so in each of the cases where mineral manures alone are used. If we look to the average weight of the bulbs, however, as given in the table, it will be seen that the development was superior in the first year to that in the second, though inferior to that in the third. The seeming depreciation in the first season, indicated by the average yield, arose from the adventitious circumstance of the greater destruction of plants by disease in that season, from which cause their number was greatly diminished. The discrepancy is therefore apparent rather than real; the result being dependent, not upon the *amount* of supply by season and manure, but upon injury which is more frequently connected with rich than with poor manuring. Again, neither the acreage produce nor the average weight of bulbs, where mineral manures alone were employed, shows so marked a superiority of the third season as compared with the first, as is evinced in the case of the farmyard-dung, by which a large amount of *organic matter* was supplied to the plants. We shall have occasion to show however, when treating of the effects of *manures* upon the growth of the turnip, that there was a deficiency of *carbonaceous supply in the soil* in the cases where mineral manures alone had been used, which gave to the farmyard-dung its superiority in the third season. Upon the whole, it is evident, from the results, that

of the three seasons the third was by far the best suited to the growth of the turnip for feeding purposes, and that the second was the least so. Of the real character of these seasons some judgment may be formed by an inspection of the following table, in which is given a summary of the statistics provided by the rain-gauge and the register thermometer, in reference to the climate of the three seasons, during the months of July, August, September, and October, which may be considered to include the period of the active growth of the turnip :—

During July (last 14 days).				During August.			
Season.	Mean Temperature.	No. of rainy days.	Inches of Rain.	Season.	Mean Temperature.	No. of rainy days.	Inches of Rain.
1843	59.7	11	1.04	1843	63.4	12	3.38
1844	65.8	3	0.55	1844	59.7	14	1.84
1845	59.4	7	0.97	1845	59.0	17	2.79

During September.				During October.			
Season.	Mean Temperature.	No. of rainy days.	Inches of Rain.	Season.	Mean Temperature.	No. of rainy days.	Inches of Rain.
1843	61.9	5	0.98	1843	49.0	15	2.62
1844	58.9	14	1.38	1844	50.2	17	4.13
1845	54.8	14	1.77	1845	50.0	10	1.39

By such a summary as is here given, of course only the general differences in the seasons are brought to light; but our readers will probably admit that the greatly increased labour of examination, were the table more extended and in detail, would scarcely be compensated for, if the main characters, requisites, and offices of the *turnip season* can be ascertained without it.

A relatively large number of rainy days, an enhanced actual amount of rain, and a low degree of temperature, are prominently the characters which distinguish the assumed turnip season of 1845 from that of the two preceding years, and during a considerable portion of the period, especially, from that of 1843.

Thus taking the items somewhat in the order in which they are given, we find that in the latter half of the month of July, upon the character of which so materially depended the early development of the plant, and on this its future growth, in the seasons of 1843 and 1845 the temperature was lower than in 1844; and in 1845 the number of rainy days is more than double that in 1844, though somewhat less than in 1843, whilst the total amount of rain was much greater in 1845 than in 1844, and nearly equal to that in 1843. In August we have in 1845 the lowest temperature, the greatest number of rainy days, and, though not the largest actual amount of rain, a quantity large compared with 1844, though below that in 1843. September indicates still the lowest temperature in 1845, a number of rainy days equal to 1844 and far exceeding 1843, and also the largest actual amount of rain. The month of October, on the other hand, shows in 1845 the *smallest* number of rainy days, as well as actual fall of rain, and a mean temperature not so low as in 1843.

In these facts, even though so general and limited in their indications, there is scarcely one which does not show that the most favourable conditions of growth for our cultivated, bulb-forming turnips are, relatively to those for the seed-producing gramineous plants, a low degree of temperature, a large number of rainy days, and a large actual amount of rain. The seeming deviation from this general postulate, which is indicated by the character of the month of October in the third or best turnip season, is, however, by no means inconsistent with our estimate of the requisites of such a season, but rather conduces still further to account for the observed superiority of effect; for whilst, compared with plants which are cultivated for highly elaborated products, such as the cereal grains, we should expect the mainly accumulative and deficiently elaborative processes of the bulb and leaf forming turnip would require a lower degree of temperature and a greater amount of moisture favouring the circulatory determinations of the plants, there is, nevertheless, a point at which depreciation in temperature is injurious to vegetation. Indeed the full growth of the turnip crop depends greatly on the postponement of the winter temperature, and hence probably arose a real advantage from the relatively high (though actually

low) temperature in the October of 1845. Again, the lower the temperature, the less important is a continuity and large amount of rain.

As a general fact, it is evident that the amount of the produce of the turnip is very materially dependent upon the climatic character of the season, not only as in itself a *resource*, but as an *essential agent* in the appropriative power of the plant, however liberal and complete may be the supply of constituents within the soil. Whilst, however, it may frequently happen that the physical characters of the season may be such as not to render available to the plant, and at once profitable to the farmer, the constituents which he has provided by manure, it is evident from the results which have been given, that, *without* an ample manuring, the best adapted season is incapable of yielding an agricultural amount of turnips. It is to be feared, however, that it is more frequently the essential condition of artificial aid, rather than that of natural climatic agency and resource, that is in defect.

Common usage seems to attribute to the turnip and green crops generally a power of collection from the atmosphere which is not recognised in our grain-yielding plants; and it may at first sight appear inconsistent with this view that the growth of the turnip in agricultural quantity should be so essentially dependent on artificial supply as our results would show to be the case. There can be no doubt that there is some truth in this current supposition; but there is little doubt that the power of collection from the atmosphere very materially depends upon the quantity and quality of the supply to the soil by manures; in fact, that upon the judicious and liberal provision of certain constituents by art we must rest our hopes for atmospheric accumulation.

Having shown, then, that climatic agencies constitute an important element in the necessary conditions of growth of our cultivated turnips, and that these are only available when associated with an abundant artificial supply of certain constituents, the question arises—What are the substances which it is essential should thus be provided? This brings us to the SECOND BRANCH of our subject, namely, the influence of *manuring* upon the growth of the turnip.

Having discussed in some detail the comparative characters of the first three seasons during which we have been conducting an extensive series of experiments under very various yet known conditions of manuring, we are prepared to consider the results of those experiments; and it is believed that those of them which were obtained in the three years referred to will amply suffice to indicate the nature of the necessary supply by manure, and also to lead to some interesting and important explanations regarding the true office of the turnip in a course of agricultural cropping, and the sources of its economic value. We would again remind our readers that the object of the experiments was not the production of large crops, but to learn, by the effects of different and known conditions of supply, in what respect and to what extent the plant was dependent upon the resources which must be kept up by the farmer, and how far he may rely upon the natural yield of the atmosphere; for it is the item of *source* of constituents, as well as that of quantity and quality, which should influence our selection of plants and manures under a truly rational and economic system of agriculture.

The experiments were commenced in the season of 1843, the early part of which, it will be remembered, was greatly superior to that of 1844 and equal to that of 1845 in suitableness to the growth of the turnip; but in the middle and latter periods it was inferior to either of the two succeeding seasons. The soil was a somewhat heavy loam, not well adapted for turnips; but as the plant is cultivated on such land with admitted advantage for rotation purposes, it was well fitted to answer our special ends. The previous crops since manure had been wheat, clover, wheat; so that in an agricultural point of view the soil might be considered as somewhat exhausted, and therefore in a favourable condition for an inquiry into the influence of supply by manuring. The description of seed was Norfolk whites. The manures and seed were drilled together on ridges, there being 25 inches between the rows. The plots allotted to each experiment comprised six rows, and consisted of about one-third of an acre. The crop was calculated from weighed quantities taken from measured portions of land, of about one-eighth of an acre for each lot, and extending across the series in three different places.

TABLE showing the results of EXPERIMENTS upon the GROWTH of TURNIPS by MANURES, at ROTHAMPSTED FARM, HERTS.—*First Season*, 1843.

Plot Nos.	DESCRIPTION OF MANURES. Quantities expressed in weight per acre. Each lot made up at the rate of fourteen bushels per acre, with clay and weed-ashes.	Average weight of bulbs in lbs. and tenths.	Number of plants per acre.	Bulb per acre compared with No. 2 as 1000.	Bulb per acre, in tons, cwts., qrs., and lbs.				Bulb per acre, if 4 plants in a square yard = 19,360 in an acre.			
					Tons.	cwts.	qrs.	lbs.	Tons.	cwts.	qrs.	lbs.
1	12 tons of farm-yard dung	1.36	15,571	2262	9	9	2	9	11	15	0	9
2	No manure	0.52	17,940	1000	4	3	3	2	4	9	2	6
3	6½ cwts. rape-cake	1.08	17,043	1967	8	4	3	12	9	6	2	21
4	5½ cwts. rape-cake, 2 bushels yeast	1.16	15,467	1926	8	1	1	11	10	0	2	1
5	8 bushels yeast	1.21	20,240	2622	10	19	2	19	10	9	0	17
6	2½ cwts. superphosphate of lime, 12lbs. sulphate of ammonia, 4 bushels of yeast	1.33	19,573	2796	11	14	0	22	11	9	3	17
7	56lbs. sulphate of ammonia	1.03	14,996	1653	6	18	1	25	8	18	0	5
8	2½ cwts. superphosphate or lime, 3¾ cwts. rape-cake	1.69	16,096	2894	12	2	1	21	14	12	0	14
9	1¼ cwts. superphosphate of lime, 5½ cwts. rape-cake	1.52	15,295	2490	10	8	2	5	13	2	2	17
10	3¾ cwts. superphosphate of lime, 1 cwt. rape-cake	1.58	18,019	3042	12	14	3	6	13	13	0	13
11	Refuse matter containing much precipitated phosphate of lime, rape-cake, &c.	1.42	17,928	2734	11	9	0	5	12	5	1	23
12	2½ cwts. superphosphate of lime, 2 cwts. rape-cake, 20lbs. sulphate of ammonia	1.48	17,112	2720	11	7	3	7	12	15	3	9
13	1¼ cwts. superphosphate of lime, 1 cwt. rape-cake, 40lbs. sulphate of ammonia	1.42	16,617	2531	10	12	0	5	12	5	1	23
14	1¼ cwts. superphosphate of lime, 3¾ cwts. rape-cake, 10lbs. sulphate of ammonia	1.23	17,790	2340	9	15	3	25	10	12	2	12
15	3¾ cwts. superphosphate of lime, 2¾ cwts. rape-cake, 20lbs. sulphate of ammonia	1.75	15,088	2841	11	17	3	18	15	2	2	0
16	3¾ cwts. superphosphate of lime, 1½ cwts. phosphate of magnesia-manure	1.39	19,975	2974	12	9	0	15	12	0	1	2
17	3¼ cwts. superphosphate of lime, 150lbs. phosphate of potass-manure	1.36	19,228	2804	11	14	3	19	11	15	0	9
18	3¼ cwts. superphosphate of lime, 84lbs. phosphate of magnesia, 75lbs. phosphate of potass	1.35	19,642	2835	11	17	2	0	11	13	1	12
19	As 18, with 30lbs. of sulphate of ammonia	1.49	19,113	3045	12	5	0	13	12	17	2	6
20	3¼ cwts. superphosphate of lime, 1½ cwts. rape-cake, 16lbs. sulphate of ammonia	1.58	16,916	2860	11	19	1	23	13	13	0	13
21	Unburnt bones decomposed by sulphuric acid, 7 bushels.	1.48	17,675	2804	11	14	3	19	12	15	3	9
22	4½ cwts. superphosphate of lime	1.47	18,446	2908	12	3	2	8	12	14	0	10
23	Clay and weed-ashes only, 15 bushels	1.32	18,745	2660	11	1	3	21	11	8	0	20

The terms superphosphate of lime, phosphate of potass, phosphate of soda, and phosphate of magnesia, as found in this table and others which follow it, are not to be understood as representing the pure chemical substances bearing those names. The composts were formed by acting upon calcined bone-dust by means of sulphuric acid in the first instance; and in the case of the alkaline salts, and the magnesian one, neutralizing the compound thus obtained, by means of cheap preparations of the respective bases.

Were we to look at the results of this table with a purely agricultural eye, the column of acreage weight of bulb would be sufficient to guide our judgment as to the efficiency of the various manures; but since the object of the experiments is rather to provide a key to the requirements of the turnip than to afford exact examples of manuring, other items than that of the actual acreage results obtained must be taken into consideration in forming an estimate respecting the nature of the conditions which cultivation should be calculated to supply. Manures, indeed, cannot be regarded only as containing certain constituents convertible into the substance of the crops, but also as agents acting beneficially or otherwise according to the form or combinations in which they are supplied, and their adaptation to soil and season. Thus it is known that the casualties and tendencies to disease or prevalence of insects often prove more destructive to the young turnip-plant under high farming, when the soil abounds in animal and vegetable matter, than when it is deficient in such substances; and the number of plants per acre may by such causes be so greatly reduced as to show a better acreage yield under bad than under liberal cultivation. The number of plants per acre must not, therefore, be overlooked in considering the results of the table. The average weight of bulb may also be taken as to some extent indicating the relative effects of different conditions of growth. Where we have an increased average weight, as well as a large number of plants, both *agency* and *supply* have been favourable to the requirements of the plant; and although the efficiency of either of them is dependent on that of the other, it may as a general fact be assumed that a high number of plants indicates a favourable *condition*, and a large average weight a favourable *amount* of supply. Bearing in mind these considerations, we have given in the last column of the table the estimated acreage yield, calculated from the actual average weight of bulb, and supposing a uniform number of plants per acre, namely, 19,360, or four in a square yard. Such an arrangement would give about 12½ inches from plant to plant along the rows, and may be taken as affording a more just view of the effects of the manures, independently of the contingencies arising from the manner of their application.

In reference to the results of this first season it must further be remarked, that the previous course having been wheat, clover, wheat, the *peculiar* exhaustion of the soil would be that induced by *corn-cropping*; and if there be any truth in the opinions which we have given elsewhere on this subject, this would imply a deficiency of nitrogen relatively to other constituents, so far as the future growth of wheat would be concerned; and it would appear from the amounts of produce without manure during the three seasons, as already given, that in some important respects the conditions of exhaustion most favourable to an investigation into the effects of *supply* for the growth of the turnip were not so prominent in the first season as afterwards, when the unaided yield was little more than a weed, so that the entire produce under manures could then be attributed either to their *agency* or their *supply*.

The following selected results, showing the average weight of bulbs and number of plants per acre yielded by manures which, compared with each other, are respectively mineral, nitrogenous, or carbonaceous, will point to some of the conditions which it is essential to provide for the healthy and rapid growth of the turnip:—

Plot Nos.	Selected Results. Description of Manures.	Number of of Plants per Acre.	Average Weight of Bulbs in lbs. and tenths.
2	No manure	17,940	0·52
3	6½ cwts. rape cakes	17,043	1·08
7	56 lbs. sulphate of ammonia	14,996	1·03
16	3¾ cwts. superphosphate of lime, 1½ cwt. phosphate of magnesia manure	19,975	1·39
17	„ „ „ 150 lbs. phosphate potass manure	19,228	1·36
18	„ „ „ 84 lbs. phos. mag., 75 lbs. phos. pot. manure . . .	19,642	1·35
22	4½ cwts. „ „	18,446	1·47

The figures in the first column show a great destruction of plants under direct ammoniacal supply, as well as considerable depreciation where rape-cake was used; and common experience teaches us that, however useful rape-cake and ammoniacal salts, or guanos containing much ammonia, may be as manures for turnips, substances of their description are never safely applied near to the seed. Other instances than those quoted above from the table at page 326, distinctly show the injurious influence of organic manures when drilled with the seed; indeed, it may be laid down as a general rule that,

especially for all spring crops, it is much more safe to apply such matters broadcast, and incorporate them well with the soil. The conflicting accounts which are given of the effects of guano and ammoniacal salts, when they are supplied to spring corn crops, and of these manures and rape-cake when used for turnips, are, it is believed, mainly attributable to differences in the manner of their application; and whilst, with a very wet season, no injury, or perhaps benefit, may arise from the use of the manure-drill in such cases, by far the safest course is to sow broadcast.

The second column of the selected results shows for this season of 1843 a considerable superiority in point of *development*, as well as *number*, of surviving plants, under purely mineral by the side of organic manures; and, compared with the unmanured plot, those having manures only mineral indicate a growth almost threefold in the same space of time, whilst the actual acreage amount of produce is in these cases very nearly as great as in any of the series; indeed, mineral manures alone have nearly trebled the unaided produce of the soil and season.

These results might almost lead us to question the importance of organic manuring for the turnip crop, and to assume that a deficiency in mineral matters was the source of impoverishment in the case of the soil selected for experiment; but, as we proceed, it will be seen that, however marked may have been the effect of mineral matters in developing the powers of growth of the plant as long as a sufficiency of organic food remained, yet a point of exhaustion was arrived at when, by a less amount of mineral matter, if in conjunction with organic supply (especially such as could yield *carbon* to the plants), the rapidity of *bulb* formation was materially enhanced.

Before leaving these results, it is as well to observe that, notwithstanding the large amount of potass required by the turnip, the direct supply of that alkali did not give a produce superior to that by superphosphate of lime. We shall have occasion to recur to the question, whether part of the effect of the latter manure is not due to its liberation in the soil of alkalis not otherwise available to the plant. All we wish to call attention to at the present is, that there was an abundant amount of alkalis in this corn-exhausted soil, which could be rendered serviceable under suitable management.

The next quotations which we shall make from the table (page 326) will serve to illustrate the effect of the artificial supply of matter for organic formations, aided by certain mineral agency and constituency:—

Plot Nos.	Selected Results. Description of Manures.	Average Weight of Bulbs.	Number of plants per acre.
8	2½ cwts. superphosphate of lime, 3¾ cwts. rape-cake	1·69	16,096
9	1¼ „ „ „ 5½ „ „	1·52	15,295
10	3¾ „ „ „ 1 „ „	1·58	18,009
12	2½ cwts. superphosphate of lime, 2 cwts. rape-cake, 20 lbs. sulphate of ammonia	1·48	17,112
13	1¾ cwt. superphosphate of lime, 1 cwt. rape-cake, 40 lbs. sulphate of ammonia	1·42	16,617
14	1¼ cwt. superphosphate of lime, 3¾ cwts. rape-cake, 10 lbs. sulphate of ammonia	1·23	17,790
15	3¾ cwts. superphosphate of lime, 2¾ cwts. rape-cake, 20 lbs. sulphate of ammonia	1·75	15,088
19	3¼ cwts. superphosphate of lime, 84 lbs. phosphate, magnesia, 75 lbs. phosphate of potass, 30 lbs. sulphate of ammonia	1·49	19,113
20	3¼ cwts. superphosphate of lime, 1½ cwt. rape-cake, 16 lbs. sulphate of ammonia	1·58	16,916

It may be objected that the average weight of bulbs, as stated above, is in itself small, and that the differences exhibited are too slight to be relied upon as showing a result. We would beg to say, however, that the estimations were taken from the whole of the bulbs that were weighed in each case, amounting to nearly 2,000, and that we believe they may be depended upon for our present purpose.

It will be remembered that with mineral manures alone there were, on an average, rather more than 19,000 plants per acre; but a glance at the results just given will show uniformly the direct supply by the drill of "organic manures" tended to lessen the number. Again, it has been seen that the highest average weight of bulbs (indicating the degree of development) was, by purely mineral manures, 1·47 lbs., by sulphate of ammonia 1·03, and by rape-cake alone 1·08 lbs. The fact that these conditions of manuring, employed singly, fall far short of their effects when combined, helps us to form some judgment as to the point at which the one or another class of constituents seems to fail, either in quantity or in adaptation to the wants of the plant.

Taking the lots 8, 9, and 10, we find the *largest* number of plants where the proportion of mineral supply to that of rape-cake is the greatest, and the *smallest* number where the rape-cake is relatively in excess. The weight of bulbs is *least* where the mineral matters are most in defect, and *greatest* where neither condition was to the other so prominent as in the other two cases.

Again, taking Nos. 12, 13, 14, and 15, in which superphosphate of lime was united with both rape-cake and ammoniacal salt, the largest weight of bulb in the entire series of the season is found to be in that case where, with a fair supply of each, no one of the several manures predominated so much as in either of the three other instances just mentioned.

Were we to place unconditional reliance upon mere supply of constituents for *actual conversion into the substance of the plant*, we should expect that the farm-yard dung would give, in every respect, the best crop of the series; but *agency*, as distinguished from mere *supply*, seems to constitute a most important item, affecting the development of those truly artificial conditions of growth which the cultivation of the turnip, for feeding and manuring purposes, so pre-eminently implies. In the farm-yard dung we had undoubtedly the largest provision of nitrogenous, and especially of carbonaceous matter; and it may be supposed that it also brought to the soil such an abundance of all the mineral substances as would be contained in a much larger crop than was produced by it.

The results arranged below will sufficiently prove that, however liberal the supply of all required constituents, the health and vigour of the plant, or its power of appropriating the food presented to it, depends upon other circumstances than the mere *amount* of that food.

Plot Nos.	Selected Results. Description of Manures.	Average Weight of Bulb.	Number of Plants per Acre.
1	12 tons farmyard-dung	1·36	15,571
8	2½ cwts. superphosphate of lime, 3¾ cwts. rape-cake	1·69	16,096
15	3¾ cwts. superphosphate of lime, 2¾ cwts. rape-cake, 20 lbs. sulphate of ammonia	1·75	15,088
18	3¼ cwts. superphosphate of lime, 84 lbs. phosphate of magnesia, 75 lbs. phosphate of potass	1·35	19,642
22	4½ cwts. superphosphate of lime	1·47	18,446

We see that the farm-yard dung gave a number of surviving plants nearly as small as any in this series, and very far short of that obtained by mere mineral, or frequently by mixed mineral and organic supply. Again, the weight of bulbs is only equal to the lowest resulting from pure mineral manuring, and inferior to that in other cases of such manuring. In Nos. 8 and 15, on the one hand, the *amount* of supply, especially of matter for organic formations, was much less than in No. 1, whilst the average weight of bulb was materially greater. On the other hand, the mineral supply was in these cases less than in 22; but there being in that instance no provision by manure of organic matter, the increased mineral supply was unavailing.

Clay and weed-ashes alone, as in No. 23, are seen to more than double the unaided produce of the soil and season, to give a fair number of plants, and an average weight of bulb nearly three-fourths as great as in any case in the series. This is a curious result, and indicates that certain mechanical as well as chemical conditions of soil, in immediate proximity to the young plant, are essential to a favourable and healthy development of its organs of collection. We learn, too, that, in some important respects, the resource of food within the soil itself could not have been so low in this first year as it appears afterwards to have been.

There are other points indicated by the results already given, than those to which we have directed attention; but, as a consideration of the experiments of the succeeding years will bring them before our readers, we need not enter upon them in this place.

Having examined in detail the results of the first year's experiments, it may be well to reiterate some of the more general and important facts and conclusions which have been elicited. It is clearly shown that, under the influence of the same season, and in a soil which, by corn-cropping, had been brought to that condition of exhaustion which common usage would remedy by the growth of turnips or other green crops by means of manure, the attempt to grow such *restorative* crop without *supplied* aid—that is, manure—is quite unavailing. We see that *agency*, as well as *supply*, is an essential element to be considered in the choice of manures; and that, unless such agency or condition of healthy function be secured, a liberal provision of the *materials* of which the plant is built up may frequently, to a great extent, be useless to it. The matters which are most favourable to the healthy

action and rapid accumulation and assimilation by the turnip, are the so-called "*mineral manures*," under the influence of which a great regularity of plant and vigorous power of growth are attained. At any rate, in the soil in question, when in a condition of *agricultural exhaustion*, the supply of *potass* by direct manures seems unessential. But the direct supply of phosphoric acid, whether by its reaction upon the soil, or a special effect upon the young plant, or from a combination of these influences, seems to enhance the assimilating actions of the turnip to a degree much beyond what could be attributed to it as a *mere constituent*, rather than in some sort an *agent* also. We shall recur further on to this interesting subject.

Of the substances which we may term pure *constituents*, "*organic matters*," and especially such as abound in *carbon*, must be supplied for the production of agricultural crops of turnip-bulbs. These manures, as well as those which are chiefly nitrogenous, should never be concentrated near to the plant in its earliest stages of growth, but only within its reach, when, under the immediate influence of mineral manures, the young plant has so far developed its organs of accumulation, and its healthy vigour, as to be competent to grow faster than the natural atmospheric and soil resources of nitrogen and carbon enable it to do. These are, we conceive, the most prominent indications afforded by the results of this our first season of experimenting upon the cultivation of the turnip. As we proceed in our inquiry we shall see how far they are confirmed by those which succeeded them, and which we shall now endeavour to detail.

The whole produce, leaf and bulb, of 1843, was carted off the land. In the second year the manures had some reference to the condition of soil as effected by the first year's treatment, and the same division of the land, and the numbering of the plots, was adopted. The manures were again drilled with the seed, and the mechanical culture of the land before and after sowing, the estimation of the crop, and its entire removal, were conducted as before.

The entire series of results of this second season (1844) are given in the following table (page 331) at one view; but we shall make selections as before, for the convenience of detailed examination.

On reference to the summary as already given of the climatic conditions of the turnip seasons of 1843 and 1844, it will be seen that in the latter half of the month of July, the low degree of temperature, the number of rainy days, and the actual amount of rain, are all most favourable to the early stages of the plant in 1843. Throughout the months of August, September, and October, on the other hand, the conditions of turnip growth, so far as season is concerned, are more favourable in 1844 than in 1843. A glance at the mean results of the two years will, however, clearly show that if the climatic influences of the second year were in the main superior to those of the first, some other circumstances must be looked for, as accounting for the great falling off in the development of the plant.

Selected and Mean Results. Description of Manures.	Average Weight of Bulbs.		Number of Plants per Acre.	
	1843.	1844.	1843.	1844.
No manure	0.52	0.36	17,940	13,736
Mean of mineral supply only	1.39	0.73	19,323	20,377
Rape-cake only	1.08	0.27	17,043	5,488
Mean of mixed mineral and organic supply ..	1.50	0.97	17,230	14,774

It is here seen, that with a more favourable season, excepting during the first few weeks in 1844, than in 1843, we have nevertheless an inferiority of development under every variety of manuring, and a very marked depreciation in the number of plants, unless where mineral manures alone were used. The destructive effects of organic manures, especially in the absence of rain during the early stages of growth, is here very evident; and the maintenance of healthy action, even under these same climatic circumstances, when purely mineral manures are employed, is clearly shown. We observe, too, that whilst under the influence of this defect of rain during the first period of the season, both the weight of bulbs and number of plants are much less where rape-cake is used alone than even where no manure at all is provided, yet the admixture of mineral manures with the organic gives the best result in the series, so far as development is concerned.

That the cause of the depreciation in average weight of bulbs during the season was, nevertheless, connected with a deficiency of matter for organic formations, and not of mineral supply, the following extracted results (page 332) will show.

TABLE showing the results of Experiments on the Growth of Turnips by Manures, at Rothamsted Farm, Herts.

Second Season, 1844.

Plot Numbers.	DESCRIPTION OF MANURES. Quantities expressed in weight per acre. Each lot made up at the rate of 14 bushels per acre, with clay and weed-ashes.	Average weight of Bulbs in lbs. and tenths.	Number of plants per acre.	Bulb per acre compared with No. 2, as 1000.	Bulb per acre in tons. cwts., qrs., and lbs.				Bulb per acre, if 4 plants in a square yard = 19,360 in an acre.			
					tons.	cwts.	qrs.	lbs.	tons	cwts.	qrs.	lbs.
1	12 tons farm-yard dung	1.19	20,096	4875	10	15	1	0	10	15	2	22
2	Unmanured	0.36	13,736	1000	2	4	1	0	3	2	0	25
3	7 cwts. rape-cake	0.27	5,488	294	0	13	0	0	2	6	2	9
4	4 cwts. superphosphate of lime, ½ cwt. phosphate of ammonia	0.92	16,768	3138	6	18	2	0	7	19	0	3
5	4 cwts. superphosphate of lime, ½ cwt. sulphate of ammonia	0.87	14,256	2498	5	10	1	0	7	10	1	15
6	3 cwts. superphosphate of lime, 15lbs. phosphate of ammonia	0.65	21,632	2867	6	6	2	0	5	12	1	12
7	3 cwts. ground apatite	0.38	17,864	1382	3	1	0	0	3	5	2	20
8	3 cwts. of apatite, decomposed by sulphuric acid, containing 200lbs. apatite	0.71	21,232	3076	6	15	3	0	6	2	2	25
9	As No. 8, with 56lbs. hydrochloric acid added (sp. gr. 1125)	0.80	20,392	3320	7	6	2	0	6	18	1	4
10	4 cwts. superphosphate of lime, 4 cwts. rape-cake	1.18	13,256	3173	7	0	0	0	10	3	3	24
11	4 cwts. superphosphate of lime, 4 cwts. rape-cake, 15lbs. phosphate of ammonia	1.29	10,320	2697	5	19	0	0	11	2	3	26
12	5 cwts. superphosphate of lime, land dug 6 inches deep	0.97	20,152	3968	8	15	1	0	8	7	2	19
13	4 cwts. superphosphate of lime, 4 cwts. rape-cake, 2 cwts. common salt	0.30	7,952	482	1	1	1	0	2	11	3	12
14	5 cwts. superphosphate of lime, land trenched with the spade 18 inches deep	0.99	13,360	2683	5	18	1	0	8	11	0	14
15	1 cwt. superphosphate of lime, 4 cwts. phosphate of soda	0.76	19,504	3013	6	13	0	0	6	11	1	13
16	1 cwt superphosphate of lime, 4 cwts. phosphate of magnesia	0.70	21,336	3024	6	13	2	0	6	1	0	0
17	1 cwt. superphosphate of lime, 4 cwts. phosphate of potass	0.66	20,552	2775	6	2	2	0	5	14	0	9
18	2 cwts. superphosphate of lime, 1 cwt. each of phosphate of potass, soda, and magnesia	0.68	18,624	2572	5	13	2	0	5	17	2	4
19	Same as No. 18, with 15lbs. phosphate of ammonia	0.73	20,352	3107	6	13	1	0	6	6	0	20
20	2 cwts. superphosphate of lime, 4 cwts. rape-cake, 56lbs. sulphate of ammonia	0.78	6,832	1084	2	7	3	0	6	14	3	8
21	374lbs. apatite, decomposed by sulphuric acid, containing 104lbs. sulphuric acid, 270lbs. apatite	0.85	18,728	3247	7	3	1	0	7	6	3	20
22	5 cwts. superphosphate of lime	0.81	21,205	3503	7	14	3	0	7	0	0	1
23	5 cwts. superphosphate of lime, 56lbs. sulphate of ammonia, 1½ cwt. nitrate of soda	0.83	10,072	1700	3	15	0	0	7	1	2	20

Plot No.	Selected Results. Description of Manures.	Average weight of bulb in lbs. and tenths.
15	1 cwt. superphosphate lime, 4 cwts. phosphate soda, manure	0.76
16	1 „ „ 4 „ phosphate magnesia, manure	0.70
17	1 „ „ 4 „ phosphate potass, manure	0.66
18	2 „ „ 1 „ each phosphate potass, soda, and magnesia, manure	0.68
19	As 18, with 15lbs. phosphate ammonia	0.73
22	5 cwts. superphosphate lime	0.81
5	4 „ „ ½ cwt. sulphate ammonia	0.87
10	4 „ „ 4 „ rape-cake	1.18
	4 „ „ 4 „ „ 15lbs. phosphate ammonia	1.29

Thus, of the purely mineral manures, the superphosphate of lime (No. 22), as in the first year, gives a higher weight of bulb than any of those where alkalies are also supplied. The substitution of 1 cwt. of superphosphate of lime, by half a cwt. of sulphate of ammonia (*see* Nos. 22 and 5), raises the weight of bulb from 0.81 to 0.87; by 4 cwt. of rape-cake (No. 10) to 1.18; and by 4 cwt. of rape-cake, with 15lbs. of phosphate of ammonia, to 1.29—the highest weight obtained during this season, that by dung not excepted.

The farm-yard dung, as in the previous year, must be supposed to have afforded the most liberal supply of all the matters necessary for conversion into the substance of the plant; yet we find that 4 cwt. of superphosphate of lime, with 4 cwt. of rape-cake, and 15lbs. of phosphate of ammonia (No. 11), give a higher average weight of bulb than the farm-yard dung; that by the former being 1.29, and by the latter 1.19. We have, however, 20,096 plants per acre by farm-yard dung, and only 10,320 by the artificial organic compost. This deficiency of plants is, however, easily accounted for, by the fact that the dung was ridged in, and the artificial compost *drilled with the seed;* so that the defect of rain during the early stages of the plant, whilst it might only retard growth in the one case, would lead to positive destruction in the other.

The very great destruction of plants, as well as the small weight of bulb, in the case of No. 3, where rape-cake alone was drilled with the seed, further show the impropriety of applying organic manures near to the seed or young plant, and the inefficiency of mere supply of constituents if the healthy development of the collective apparatus of the plant be not secured. The effects of ammoniacal salts, as they have been before described, depending upon a proper combination with other constituents, are further exhibited in the results of this second year. The variations in the number of plants and weight of bulbs, in Nos, 4, 5, and 6, and also in the results of these numbers as compared with those of Nos. 11 and 20 here given, may be adduced in illustration of this fact.

Plot Nos.	Selected Results. Description of Manures.	Average Weight of Bulbs in lbs.	Number of Plants per Acre.
4	4 cwts. superphosphate lime, ½ cwt. phosphate ammonia	0·92	16,768
5	4 „ „ „ ½ cwt. sulphate „	0·87	14,256
6	3 „ „ „ 15 lbs. phosphate „	0·65	21,632
11	4 cwts. superphosphate lime, 15 lbs. phosphate ammonia, 4 cwt. rape-cake	1·29	10,320
20	2 cwts. superphosphate lime, ½ cwt. sulphate ammonia, 4 cwt. rape-cake	0·78	6,832

Thus there is a slight superiority in No. 4. over No. 5, both in development and number of plants; phosphate of ammonia being used in the former, and sulphate in the latter. In No. 6, as compared with the two preceding, the amount of phosphoric acid is diminished, but in a greater degree that of ammonia, to which body may be attributed an injurious effect upon the health of the plant when in excess, or not sufficiently incorporated with the soil, and a beneficial one after not only necessary diffusion has taken place, but the plants themselves have attained some strength and vigour. As might be expected, then the number of plants is greater, though the average weight of bulbs is less in No. 6 than in 4 and 5.

Comparing with each other Nos. 6 and 11, in which the amount of ammoniacal salts supplied by manure was identical, we find that an increase of superphosphate of lime by 1 cwt., and the addition of 4 cwt. of rape-cake (No. 11), whilst they reduced

the number of plants from 14,256 to 10,320 (an effect certainly not due to the superphosphate of lime), at the same time raised the average weight of bulb from 0·65 to 1·29; showing the benefit of the supply of *organic matter* in those cases where it had not proved injurious or destructive to the plants, and the other conditions were such as to favour their healthy growth. Again, in No. 20, as compared with No. 11, the amount of supply by rape-cake is equal; that of ammoniacal salt much greater; but that of the important constituent and agent, superphosphate of lime, is diminished. The result is a very great depreciation, not only in number of plants, but in the average weight of bulbs.

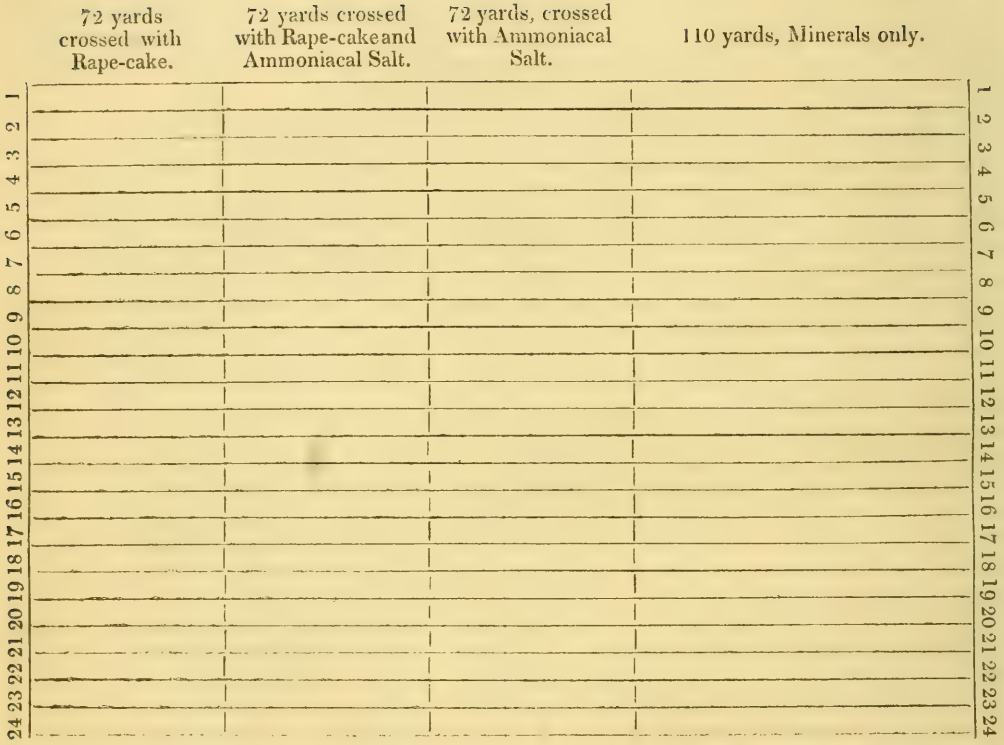
We have now given and examined the results of the first two seasons of our experiments upon the joint effects of climate and manures on the growth of the turnip bulb; and comparing the general character of the one season and its results with that of the other, we see, that although the climatic or vehicular and accumulative agencies were, during the largest portion of the time of growth, more favourable in 1844 than in 1843, yet the produce was, in the main, much inferior under the superior circumstances of climate. This can only be attributed to deficiency in some essential agency or supply, apart from those of season alone; and since those instances in this season, in which mineral supply is most liberal, show by the number of plants a degree of healthy condition, and yet an inferior rate of growth, we conclude that the soil was exhausted of matter for organic formations. That the defect is carbonaceous rather than nitrogenous, is learnt from a careful comparison of the effects of rape-cake and of ammoniacal salts.

Again, the conclusions elicited by a close examination of this second year's experiments are seen to be identical in kind with those to which we were led by the first year's results and in their degree afford even clearer testimony—rather than mere confirmation—on most of the points which had been previously discussed. It is the less important, however, to give a recapitulation in this place, as we have yet the entire results of the third season (1845) to detail; and, having accomplished that part of our task, we shall be prepared to give a *résumé* of the three years' series.

The destructive effects of some substances, when applied near to the seed, led us to sow the manures and the seed separately in the third year of our experiments. The same division into plots was observed as previously; but besides the drilled manures, which, though for the most part mineral, were sown before the seed, and at a somewhat greater depth, the entire series of plots were crossed by bands 72 yards in width; which were sown respectively with rape-cake, ammoniacal salt, and rape-cake and ammoniacal salt together, a sufficient portion being left having drilled manures only. These cross-dressings were sown broad-cast, before the ridges first drawn out had been split and turned over, so that there could be little danger of injury to seed and young plants. By this arrangement of manuring, for each of the more than 20 conditions of "ash-constituent" supply, four of varying resource of matter for organic formations were secured; so that the number of experiments was raised to nearly 90.

It is to be regretted that in the first two seasons of our experiments the acreage produce of leaf, and the relation of leaf to bulb, were not taken; as climate and manuring have a marked influence on the character of the turnip-crop in this respect, besides that which is known to depend upon the mechanical qualities of soil. A consideration of the relative and actual amount of leaf is moreover found to be of material importance in estimating the feeding value, degree of maturity, and probable resources of further growth of the plant. All the statement which we are able to give on this subject in reference to these two years is, that both the acreage weight of leaf, and the proportion of leaf to bulb, were much greater in 1843 than in 1844; there being in the former case a much more liberal provision of organic matter remaining in the soil, though at the same time a less amount of rain and a higher temperature. The leaves were weighed in the third year, and so far as the effects of different conditions of manuring, under the influence of one and the same season, are concerned, the results obtained are of some interest.

The results of the third year (1845) are given in five sections or divisions: and for the convenience of reference and examination, the statement of the manures is attached to each of these divisions. The different degrees of maturity exhibited under the influence of the varying supply for organic formations, provided by the cross dressings, led us to weigh some of the crops at twice, that their progressive changes might be ascertained. The order of maturity which was observed was as follows:—1st. The lengths under drilled manures only (chiefly mineral). 2nd. Those having rape-cake added. 3rd. Those having ammoniacal salt added; and 4th. Those with both rape-cake and ammoniacal salt in addition to the mineral manures. The first weighing was taken in December, when the leaves under mineral supply had considerably drooped and changed colour; the rest exhibiting degrees of retained vitality in the inverse order indicated above. The second weighing was taken early in January, and three weeks later than the first, as will be seen on inspection of the tables.



The plan of the field given above will further show the method of manuring adopted in 1845. In the two previous years each experiment extended from one end of the field to the other; in 1845, 72 yards down the field was sown by hand, across the rows, respectively with rape-cake equal to 10 cwt. per acre, 10 cwt. rape-cake and 3 cwt. sulphate of ammonia, 3 cwt. sulphate of ammonia: the manures given as drilled manures were then drilled down the entire length of the field. Thus, from 3 to 24 inclusive, each space of land which was on experiment in 1843 and 1844 was, in 1845, divided into 4. The figures represent the same spaces of land each year. For example, No. 2 was unmanured in 1843 and 1844; in 1845 one part was unmanured, one was crossed with rape-cake, one with rape-cake and ammoniacal salt, and one with ammoniacal salt. The plan adopted in 1845 has been continued in 1846 and 1847.

Division 1.—Quantity of Bulb per Acre, in tons, cwts., qrs., and lbs.

Plot Numbers.	Description of Drilled Manures. Quantities expressed in Weight per Acre.	Drilled Manures only.				Drilled Manures, and 10 cwt. Rape-cake per Acre.				Drilled Manures, and 3 cwt. Sulphate of Ammonia per Acre.								Drilled Manures, with 10 cwt. Rape-cake and 3 cwt. Sulphate of Ammonia per Acre.							
										First Gathering.				Second Gathering. (3 weeks later.)				First Gathering.				Second Gathering. (3 weeks later.)			
		tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.
1	12 tons farm-yard dung ridged in	17	0	3	6	....				14	18	3	12												
2	Unmanured	0	13	2	24	7	10	0	16	0	9	0	24	1	13	0	0	5	14	1	4	5	0	2	24
3	8 cwt. rape-cake	4	16	0	16	9	8	2	24	4	7	1	20	5	8	2	8	7	3	0	16	8	0	2	8
4	130lbs. calcined bone-dust, 130lbs. sulphate of ammonia, 130lbs. hydrochloric acid (sp. gr. 1·18)	8	17	1	20	12	2	2	8	7	12	0	0	9	7	0	16	7	4	0	0	9	16	2	8
5	160lbs. superphosphate of lime, 130lbs. sulphate of ammonia.	5	16	1	18	9	9	2	18	6	7	1	14	8	7	1	20	7	0	3	12	8	6	3	12
6	160lbs. superphosphate of lime, 5 cwts. train oil	6	10	0	16	9	8	1	4	6	3	2	24	6	16	3	12	6	13	2	24	8	19	2	24
7	12 cwts. sulphate of lime (the refuse of tartaric acid manufacture)	5	13	2	24	18	1	0	0	4	15	1	20	4	8	1	4	7	3	1	20	8	10	2	8
8	400lbs. calcined bone-dust	10	4	0	16	11	13	3	12	9	12	0	0	10	4	0	0	10	6	0	0	10	12	2	8
9	400lbs. calcined bone-dust and hydrochloric acid (equivalent to 268 lbs. sulphuric acid, sp. gr. 1·70)	9	9	1	20	8	13	1	4	8	11	1	20	8	12	2	8	7	1	0	16	7	19	2	24
10	400lbs. calcined bone-dust, 134lbs. sulphuric acid	12	18	2	6	13	18	1	4	12	9	2	24	12	14	2	8	12	2	0	0	11	17	1	20
11	400lbs. calcined bone-dust, 268lbs. sulphuric acid	13	11	0	0	14	0	1	4	12	9	0	16	12	18	2	8	11	16	0	0	12	17	2	24
12	11 cwt. superphosphate of lime (land dug 9 inches deep in 1844)	13	8	2	8	14	5	1	4	12	11	0	16	12	14	0	0	11	4	1	4	13	9	1	20
13	400lbs. calcined bone-dust, 268lbs. sulphuric acid, 134lbs. common salt	14	10	0	4	13	1	2	8	12	9	1	20	12	6	0	0	9	14	0	0	11	12	1	4
14	11 cwt. superphosphate of lime (land trenched 18 in. deep in 1844)	14	4	0	0	14	9	0	0	13	18	1	4	14	10	0	0	12	8	1	0	13	12	1	4
15	400lbs. calcined bone-dust, 420lbs. sulphuric acid, 315lbs. soda ash	11	15	3	12	12	8	3	12	12	8	2	8	13	0	0	0	11	3	1	20	11	13	2	24
16	400lbs. calcined bone-dust, 420lbs. sulphuric acid, 220lbs. magnesian limestone	12	1	0	0	14	3	2	24	12	14	3	12	12	19	0	16	11	17	2	24	13	4	2	8
17	400lbs. calcined bone-dust, 420lbs. sulphuric acid, 470lbs. pearlash	10	19	0	16	12	19	0	0	12	4	1	14	12	0	0	0	11	13	0	16	11	17	2	24
18	400lbs. calcined bone-dust, 420lbs. sulphuric acid, 105lbs. soda ash, 74lbs. mag. limestone, 157lbs. pearlash	12	12	2	8	13	18	2	24	12	16	3	22	13	12	0	0	13	1	3	6	13	15	1	20
19	As No. 18, with 1 cwt. sulphate of ammonia	12	7	0	0	11	5	2	8	10	0	3	12	10	16	1	4	9	16	0	0	11	8	2	8
20	As No. 18, with 3 cwt. rape-cake	14	7	2	8	14	6	0	0	12	8	2	10	13	8	0	0	12	9	2	24	12	18	0	0
21	400lbs. calcined bone-dust, 400lbs. sulphuric acid	13	2	2	24	14	8	1	20	11	13	1	20	12	6	0	0	12	4	0	0	13	4	2	8
22	11 cwt. superphosphate of lime	12	13	3	12	14	0	2	0	11	0	3	12	11	9	2	24	12	10	3	4	13	5	0	16
23	3 cwt. sulphate of ammonia		....				....			3	4	1	4												
24	Mean mixture of all other drilled manures, exclusive of Nos. 1 and 23	13	17	0	0																				
	Mean results	10	10	0	16	12	3	1	24	9	17	3	12	10	9	2	14	10	0	1	13	11	1	0	16

Division 2.—Quantity of Leaf per Acre, in tons, cwts., qrs., and lbs.

Plot Numbers.	Description of Drilled Manures. Quantities expressed in Weight per Acre.	Drilled Manures only.				Drilled Manures, and 10 cwt. Rape-cake per Acre.				Drilled Manures, and 3 cwt. Sulphate of Ammonia per Acre.								Drilled Manures, with 10 cwt. Rape-cake and 3 cwt. Sulphate of Ammonia per Acre.							
										First Gathering				Second Gathering. (3 weeks later.)				First Gathering.				Second Gathering. (3 weeks later.)			
		tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs	lbs.	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.
1	12 tons farm-yard dung, ridged in	7	7	3	2	.	.	.	.	10	8	3	12												
2	Unmanured	0	14	1	4	4	16	2	24	0	6	2	16	0	18	0	0	4	16	0	0	4	10	0	0
3	8 cwt. rape-cake	4	5	0	0	8	9	1	4	4	14	1	4	4	6	2	8	8	8	1	6	7	18	3	12
4	130lbs. calcined bone-dust, 130lbs. sulphate of ammonia, 130lbs. hydrochloric acid (sp. gr. 1·18)	4	9	1	4	6	6	0	16	6	7	0	16	5	12	0	0	8	2	0	0	6	14	2	8
5	160lbs. superphosphate of lime, 130lbs. sulphate of ammonia	4	8	1	4	6	0	2	24	6	6	3	12	6	0	1	4	8	4	0	0	7	15	0	16
6	160lbs. superphosphate of lime, 5 cwt. train oil	3	0	3	12	4	9	1	20	5	4	0	0	4	14	6	12	7	5	0	16	5	19	1	20
7	12 cwt. sulphate of lime (refuse of tartaric acid process)	2	19	3	12	4	17	0	0	3	6	3	12	2	8	2	8	5	5	0	16	4	8	2	8
8	400lbs. calcined bone-dust	3	12	3	12	5	8	1	20	6	12	1	4	5	2	3	12	7	14	3	12	5	17	2	24
9	400lbs. calcined bone-dust, hydrochloric acid (= 268lbs. sulphuric acid, sp. gr. 1·70)	4	6	3	12	5	6	0	16	6	18	3	12	5	4	2	8	7	14	3	12	5	6	3	12
10	400lbs. calcined bone-dust, 134lbs. sulphuric acid	3	16	3	2	5	14	1	16	5	5	1	20	5	3	1	20	7	5	2	24	7	3	0	16
11	400lbs. calcined bone-dust, 268lbs. sulphuric acid	4	14	1	4	5	15	2	24	6	4	0	0	5	3	1	20	7	1	0	16	6	13	1	20
12	11 cwt. superphosphate of lime (land dug 9 in. deep in 1844)	4	9	0	0	5	16	2	8	6	18	1	4	5	9	3	20	8	8	2	8	7	2	3	12
13	400lbs. calcined bone-dust, 268lbs. sulphuric acid, 134lbs. common salt	6	11	0	10	6	3	0	0	8	4	3	14	7	14	0	0	8	19	1	20	8	9	0	16
14	11 cwt. superphosphate of lime (land drenched 18 in. deep in 1844)	4	4	0	16	6	10	2	24	7	8	2	8	6	7	2	24	8	16	3	12	7	14	1	4
15	400lbs. calcined bone-dust, 420lbs. sulphuric acid, 315lbs. soda ash	3	10	2	14	5	2	0	16	8	0	1	4	5	12	3	12	8	8	2	8	6	12	2	8
16	400lbs. calcined bone-dust, 420lbs. sulphuric acid, 220lbs. magnesian limestone	3	17	1	4	4	15	0	18	6	6	2	8	5	8	3	12	7	3	2	24	6	8	0	0
17	400lbs. calcined bone-dust, 420lbs. sulphuric acid, 670lbs. pearlash	3	10	0	0	4	10	3	12	6	0	3	12	5	3	2	24	7	2	2	8	6	6	2	8
18	400lbs. calcined bone-dust, 420lbs. sulphuric acid, 105lbs. soda ash, 74lbs. magnesian limestone, 157lbs. pearlash	3	7	2	8	5	12	1	4	6	1	1	20	4	10	3	12	6	16	2	8	5	16	2	8
19	As No. 18, with 1 cwt. sulphate of ammonia	4	8	2	24	6	4	1	20	7	3	0	16	5	18	2	8	8	11	2	24	6	14	0	0
20	As No. 18, with 3 cwt. rape-cake	5	1	0	16	6	5	2	24	7	6	0	0	5	17	0	16	9	5	2	24	6	11	2	24
21	400lbs. calcined bone-dust, 400lbs. sulphuric acid	4	5	0	16	6	3	0	0	6	15	1	20	5	0	3	12	6	18	0	0	7	18	3	8
22	11 cwt. superphosphate of lime	4	8	0	0	6	0	0	0	7	0	2	8	5	0	3	12	6	8	2	24	6	13	1	20
23	3 cwt. sulphate of ammonia		.	.	.		.	.	.	1	14	0	8												
24	Mean mixture of all other drilled manures, exclusive of Nos. 1 and 23	3	3	1	2																				
	Mean results	4	0	0	6	5	14	2	17	6	2	2	0	5	1	3	17	7	11	1	7	6	12	1	13

DIVISION 3.—Average Weight of Bulbs, in Pounds and Tenths.

Plot Numbers.	DESCRIPTION OF DRILLED MANURES. Quantities expressed in Weight per Acre.	Drilled Manures only.	Drilled Manures, and 10 cwts. Rape Cake per Acre.	Drilled Manures, and 3 cwts. Sulphate of Ammonia per Acre.		Drilled Manures, with 10 cwts. Rape Cake and 3 cwts. Sulphate of Ammonia per Acre.	
				First Gathering.	Second Gathering (3 weeks later).	First Gathering.	Second Gathering (3 weeks later).
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1	12 tons farm-yard dung, ridged in	1·61	..	1·45	..	..	..
2	Unmanured	0·11	0·67	0·066	0·22	0·50	0·49
3	8 cwts. rape-cake	0·49	0·87	0·47	0·55	3·56	0·80
4	130 lbs. calcined bone dust, 130 lbs. sulphate of ammonia, 130 lbs. hydrochloric acid (sp. gr. 1·18)	0·92	1·14	0·77	0·89	0·81	0·98
5	160 lbs. superphosphate of lime, 130 lbs. sulphate of ammonia	0·90	1·04	0·77	0·95	0·72	0·87
6	160 lbs. superphosphate of lime, 5 cwts. train oil	0·59	0·90	0·55	0·62	0·64	0·86
7	12 cwts. sulphate of lime (refuse of tartaric acid manufacture)	0·59	0·94	0·54	0·46	0·68	0·89
8	400 lbs. calcined bone dust	0·92	1·10	0·94	0·95	0·97	1·00
9	400 lbs. calcined bone dust, hydrochloric acid (=268 lbs. sulphuric acid, sp. gr. 1·70)	1·02	1·16	0·99	0·99	0·87	0·96
10	400 lbs. calcined bone dust, 134 lbs. sulphuric acid	1·18	1·33	1·25	1·20	1·10	1·14
11	400 lbs. calcined bone dust, 268 lbs. sulphuric acid	1·23	1·38	1·19	1·22	1·11	1·22
12	11 cwts. superphosphate of lime (land dug 9 inches deep in 1844)	1·20	1·39	1·19	1·23	1·07	1·25
13	400 lbs. calcined bone dust, 268 lbs. sulphuric acid, 134 lbs. common salt	1·38	1·27	1·16	1·20	1·03	1·13
14	11 cwts. superphosphate of lime (land trenched 18 inches deep in 1844)	1·30	1·33	1·30	1·37	1·19	1·26
15	400 lbs. calcined bone dust, 420 lbs. sulphuric acid, 315 lbs. soda ash	1·11	1·37	1·14	1·17	1·10	1·16
16	400 lbs. calcined bone dust, 420 lbs. sulphuric acid, 220 lbs. magnesian limestone	1·11	1·35	1·21	1·25	1·14	1·23
17	400 lbs. calcined bone dust, 420 lbs. sulphuric acid, 470 lbs. pearlash	1·02	1·27	1·16	1·09	1·13	1·08
18	400 lbs. calcined bone dust, 420 lbs. sulphuric acid, 105 lbs. soda ash, 74 lbs. magnesian limestone, 157 lbs. pearlash	1·16	1·33	1·18	1·24	1·25	1·29
19	As No. 18, with 1 cwt. sulphate of ammonia	1·16	1·24	1·02	1·09	1·09	1·15
20	As No. 18, with 3 cwts. rape-cake	1·28	1·40	1·18	1·29	1·18	1·23
21	400 lbs. calcined bone dust, 400 lbs. sulphuric acid	1·22	1·41	1·10	1·15	1·18	1·20
22	11 cwts. superphosphate of lime	1·17	1·33	1·06	1·24	1·17	1·24
23	3 cwts. sulphate of ammonia	..	..	0·37	..	..	..
24	Mean mixture of all the other drilled manures, exclusive of Nos. 1 and 23	1·27	..	..	..	..	..
	Mean results	1·00	1·20	0·96	1·02	0·98	1·07

DIVISION 4.—Number of Plants per Acre.

Plot Numbers.	DESCRIPTION OF DRILLED MANURES. Quantities expressed in Weight per acre.	Drilled Manures only.	Drilled Manures, and 10 cwts. Rape Cake per Acre.	Drilled Manures, and 3 cwts. Sulphate of Ammonia per Acre.		Drilled Manures, with 10 cwts. Rape Cake and 3 cwts. Sulphate of Ammonia per Acre.	
				First Gathering.	Second Gathering (3 weeks later).	First Gathering.	Second Gthering (3 weeks later).
1	12 tons farm-yard dung, ridged in	23,731	..	23,104	..	..	..
2	No manure	13,296	24,944	15,456	16,848	24,160	23,088
3	8 cwts. rape-cake	21,952	24,240	20,896	22,016	20,544	23,304
4	130 lbs. calcined bone dust, 130 lbs. sulphate of ammonia, 130 lbs. hydrochloric acid (sp. gr. 1·18)	24,000	23,712	22,368	23,488	20,000	22,496
5	160 lbs. superphosphate of lime, 130 lbs. sulphate of ammonia	14,544	20,448	19,296	19,776	21,824	21,472
6	160 lbs. superphosphate of lime, 5 cwts. train oil	24,528	23,632	24,992	24,576	23,264	23,424
7	12 cwts. sulphate of lime (the refuse of tartaric acid manufacture)	21,408	23,952	19,584	21,376	23,488	23,616
8	400 lbs. calcined bone dust	21,986	23,760	22,944	24,132	23,808	23,872
9	400 lbs. calcined bone dust and hydrochloric acid (= 268 lbs. sulphuric acid, sp. gr. 1·7)	20,784	16,672	19,360	19,584	18,272	18,624
10	400 lbs. calcined bone dust and 134 lbs. sulphuric acid	24,704	23,456	22,368	23,808	24,476	23,360
11	400 lbs. calcined bone dust and 268 lbs. sulphuric acid	24,624	22,800	23,360	23,712	23,872	23,744
12	11 cwts. superphosphate of lime (land dug 9 inches deep in 1844)	25,120	23,072	23,606	23,136	23,520	24,160
13	400 lbs. calcined bone dust, 268 lbs. sulphuric acid, 134 lbs. common salt	23,620	23,104	24,128	23,040	21,152	23,008
14	11 cwts. superphosphate of lime (land trenched 18 inches deep in 1844)	24,464	24,368	23,936	23,872	23,328	24,224
15	400 lbs. calcined bone dust, 420 lbs. sulphuric acid, 315 lbs. soda ash	23,792	20,384	24,352	24,960	22,720	22,592
16	400 lbs. calcined bone dust, 420 lbs. sulphuric acid, 220 lbs. magnesian limestone	24,336	23,470	23,584	23,200	23,456	24,032
17	400 lbs. calcined bone dust, 420 lbs. sulphuric acid, 470 lbs. pearlash	24,160	22,800	23,648	24,608	23,200	24,544
18	400 lbs. calcined bone dust, 420 lbs. sulphuric acid, 105 lbs. soda ash, 74 lbs. magnesian limestone, 157 lbs. pearlash	24,448	23,404	24,448	24,480	23,392	24,000
19	As No. 18, with 1 cwt. sulphate of ammonia	23,888	20,448	22,112	22,304	20'222	22,304
20	As No 18, with 3 cwts. rape-cake	25,120	22,896	23,680	23,200	23,680	23,552
21	400 lbs. calcined bone dust, 400 lbs. sulphuric acid	24,160	22,912	23,712	23,904	23,168	24,608
22	11 cwts. superphosphate of lime	24,352	23,544	23,424	20,800	23,936	23,872
23	3 cwts. sulphate of ammonia	..	..	19,328	..	..	..
24	Mean mixture of all the other drilled manures, exclusive of Nos. 1 and 23	24,352	..	..	..	..	..
	Mean results	22,962	22,763	22,440	22,705	23,028	23,233

DIVISION 5.—PROPORTION of LEAF to BULB; Bulb as 1,000.

Plot Numbers.	DESCRIPTION OF DRILLED MANURES. Quantities expressed in Weight per Acre.	Drilled Manures only.	Drilled Manures, and 10 cwts. Rape-cake per Acre.	Drilled Manures, and 3 cwts. Sulphate of Ammonia per Acre.		Drilled Manures, with 10 cwts. Rape-cake and 3 cwts. Sulphate of Ammonia per Acre.	
				First Gathering.	Second Gathering 3 (weeks later)	First Gathering.	Second Gathering 3 (weeks later).
1	12 tons farm-yard dung, ridged in; no drilled manures	433	—	698	—	—	—
2	No manure	1,041	644	720	545	840	892
3	8 cwts. rape-cake	884	896	1,078	797	1,176	909
4	130lbs. calcined bone dust, 130lbs. sulphate of ammonia, 130lbs. hydrochloric acid (sp. gr. 1·18)	452	520	837	592	1,126	704
5	160lbs. superphosphate of lime, 130lbs. of sulphate of ammonia	758	636	943	718	1,164	930
6	160lbs. superphosphate of lime, 5 cwts. train oil	467	475	840	693	1,085	664
7	12 cwts. sulphate of lime (refuse of tartaric acid manufacture)	526	482	700	550	737	519
8	400lbs. calcined bone dust	356	463	686	504	741	553
9	400lbs. calcined bone dust, hydrochloric acid (= 268lbs. sulphuric acid)	458	612	809	606	1,009	669
10	400lbs. calcined bone dust, 134lbs. sulphuric acid	296	410	422	445	602	602
11	400lbs. calcined bone dust, 268lbs. sulphuric acid	348	412	492	438	580	512
12	11 cwts. superphosphate of lime (land dug 9 inches deep in 1844)	331	408	550	467	751	530
13	400lbs. calcined bone dust, 268lbs. sulphuric acid, 134lbs. common salt	451	470	666	626	925	727
14	11 cwts. superphosphate of lime (land trenched 18 inches deep in 1844)	296	452	533	440	712	560
15	400lbs. calcined bone dust, 420lbs. sulphuric acid, 315lbs. soda ash	299	410	644	434	754	561
16	400lbs. calcined bone dust, 420lbs. sulphuric acid, 220lbs. magnesian limestone	320	335	496	420	604	483
17	400lbs. calcined bone dust, 420lbs. sulphuric acid, 470lbs. pearlash	319	350	494	432	611	532
18	400lbs. calcined bone dust, 420lbs. sulphuric acid, 105lbs. soda ash, 74lbs. magnesian limestone, 157lbs. pearlash	267	402	472	334	521	423
19	As No. 18, with 1 cwt. sulphate of ammonia	264	551	712	549	876	586
20	As No. 18, with 3 cwts. rape-cake	351	439	587	437	743	510
21	400lbs. calcined bone dust, 400lbs. sulphuric acid	324	426	580	375	509	600
22	11 cwts. superphosphate of lime	345	427	636	456	512	505
	Mean results	416	486	634	521	789	617

With such a mass of experimental evidence before us, it is difficult to select a starting-point such as will lead us to the most natural order of illustration, and the clearest comprehension of their most prominent indications and conclusions. In many respects these results are most interesting, confirming as they do the opinions suggested by those which have preceded them; and affording at the same time data, the consideration of which enables us to determine other important questions than those already attended to.

It will be recollected that the statement given of the character of this third season, compared with that of the second, was, so far as all the conditions shown to be essential to the vigorous growth of the turnips were concerned, very much in favour of the one about to occupy our attention; and it is seen that the acreage produce is pretty uniformly nearly doubled where artificial supply for organic formations is much the same. It is true that the number of plants per acre being much greater than heretofore, some of the actual acreage increase may be attributed to this cause; but all we wish to maintain is the general effect of season upon the growth of the cultivated turnip.

The absolute necessity of a liberal supply of *constituents*, even with the most favourable climatic circumstances, and under the influence of the best observed conditions of self-reliance, or collective power depending on mineral supply, is, however, clearly proved by the results of the farm-yard dung, the unmanured plot, and the mean of the purely mineral manures. They are here given in illustration.

Selected Results. Description of Manures.	Bulb per Acre, in				Average Weight of Bulbs, in lbs. and Tenths.	Number of Plants per Acre.
	tons.	cwts.	qrs.	lbs.		
Unmanured	0	13	2	24	0·11	13,296
Mean by purely mineral supply . . .	12	8	2	3	1·16	23,882
Farm-yard dung	17	0	3	6	1·61	23,731

Thus, in the best suited of the three seasons to which our experiments refer, the unmanured plot gives a produce of only 13 cwts. per acre, an average weight of bulb under two ounces, and a number of surviving plants little more than half that observed under conditions of artificial supply. In this same season, on the other hand, the farm-yard dung gives the largest acreage produce obtained throughout the entire series of seasons and experiments, a weight of bulb higher than any other manure in the same season, and a number of plants nearly identical with that under mineral manures only. Again, by mineral supply only—to which, indeed, as we have seen, may be attributed an influence upon the growth of the plant apart from that which can be traceable to the mere provision of *crop-material*—we have as many tons of produce as the unmanured plot gives cwts., a weight of bulb more than ten times as great, and a number of healthy plants nearly double. By the side of the farm-yard dung, however, which we presume to contain a sufficiency of *all the constituents* of a large crop of turnips (though, excepting under the influence of continuity of rain and a relatively low temperature, not calculated to develop the most healthy conditions of growth), we find that the purely mineral manuring, with a number of plants per acre almost identical, shows a formation of bulb within an equal period of time little more than two thirds as great. We shall presently see that the largest weight of *bulb formed in a given time* is not to be taken as affording an unconditional index to the value or promise of the crop; but in the instances now cited it may, in a pre-eminent degree, be quoted as such; for we know that whilst the plants under minerals only had, when weighed, arrived at their full growth, those having farm-yard dung had still vitality and resources.

Before tracing any further the probable source of the superiority of farm-yard over the purely mineral manures, we will refer to some other of the points which our arrangement of manuring elucidates. In the two former years it was observed that, whereever either ammoniacal salts or rape-cake were drilled with the seed, a great depreciation and irregularity in the number of plants per acre resulted; and it may have appeared to some of our readers that we have, without sufficient ground, referred the deficiency of plants to the manner of applying these organic manures; and that, omitting the indications of the actual acreage results, our reasonings are fallacious. The following summary of the number of plants obtained, when ammoniacal salts and rapecake are sown broadcast and ploughed in, and of that resulting from the use of mineral manures alone, will show how highly important it is not only to select a manure such as the plant requires, but so to apply it as to ensure a beneficial rather than an injurious result.

The uniformity under the various classes of manures in this season, as compared with others, is very striking; though, as before, the mineral manure gives somewhat the higher number. The coincidence throughout the entire series of about 90 different combinations of manures (see Division 4 of Table) is such that, for the first time, the acreage amount of produce may be taken as a somewhat true measure of the value of the manures. The drilled manures, as has already been stated, were this year sown alone before the seed, yet the detailed results given in division 4 of the Table still afford instances of the injurious effect arising from the proximity to the plant of certain manures, though in so slight a degree as to be almost immaterial.

Summary.* Description of Manures.	Number of Plants per Acre.
Mean of mineral manures alone	23,882
,, ,, with rape-cake added	22,596
,, ,, with ammoniacal salt added	23,598
,, ,, with both rape-cake and ammoniacal salt	22,954

The influence of climatic condition, not only as of itself a source of constituents, but as rendering available the supplies provided by the farmer, is strikingly illustrated by the details next quoted: wherein it is seen that notwithstanding the comparatively large number of plants in 1845, which might be supposed to prevent individual development, there is a marked increase as compared with 1844.

Description of Manures.	Number of Plants per Acre		Average weight of Bulbs.	
	1844.	1845.	1844.	1845.
Farm-yard dung	20,096	23,731	1.19	1.61
Mean of purely mineral manures	20,377	23,882	0.73	1.16

It is here seen that, even with so great a number of plants, the average weight of bulb is very considerably higher in 1845 than in 1844. In the case of the dung the supply by manure is not supposed to be better than in 1844. In the case of the mineral manures, however, the quantities were larger than before; but the accumulation of organic constituents must have been almost entirely from atmospheric resources. A comparison of the results of the one year with those of the other, as given above, sufficiently prove then the essential influence of climatic agency for the development of the turnip-bulb in *full agricultural quantity;* but the great defect in formation of bulb within a given time, under the influence of one and the same season, when a full supply of mineral manure only is provided, as compared with that of organic matter, also again teaches how imperative it is that there be a liberal provision of such matter in the soil, if we would produce the largest crop which the characters of the season admit of.

The results already selected from the table do not, however, show us whether this required supply by manure of matter for organic formations should be more prominently nitrogenous, as in the case of wheat, or *carbonaceous*. This point we shall presently recur to; but, before doing so, shall study the effects of varying the mineral supply by manure.

The average weight of bulb, as effected by the amount of *free* phosphoric acid, or superphosphate of lime, supplied to the soil by manures, is here given :—

* It will be remembered that in former years the plants were set out with the view of retaining about four to a square yard, or 19,360 upon an acre; the design in this third year was to increase the number to about five instead of four, which is equal to 24,200 to the acre, and hence the actual numbers in the table just given are much higher than hitherto.

Plot Numbers.	Description of Drilled Manures.	Average weight of Bulbs, in lbs.			
		Drilled Manures only.	Drilled Manures, and 10 cwt. Rape-cake per Acre.	Drilled Manures and 3 cwt. Sulph. Am. per acre.	Drilled Manures, and 10 cwt. Rape-cake, and 3 cwt. Sulph. Am. per Acre.
8	400 lbs. calcined bone-dust	0.92	1.10	0.96	0.97
9	400 lbs. calcined bone-dust and hydrochloric acid = 268 lbs. sulphuric acid..	1.02	1.16	0.99	0.87
10	400 lbs. calcined bone-dust and 134 lbs sulphuric acid	1.18	1.33	1.25	1.10
11	400 lbs. calcined bone-dust and 268 lbs. sulphuric acid	1.23	1.38	1.19	1.11
21	400 lbs. calcined bone-dust and 400 lbs. sulphuric acid	1.22	1.41	1.10	1.18
	Mean of the results by sulphuric acid.. ..	1.21	1.37	1.18	1.13

It is seen that, under all the varying conditions of organic supply, the undecomposed bone-dust produced less effect than the decomposed. Hydrochloric acid has caused a slight increase in bulb where there was no organic manure, and where rape-cake or ammoniacal salt only was added; but where ammoniacal salt and rape-cake were employed together, the formation of bulb was less than by undecomposed bone-dust. But a reference to division 2 of the Table of collected results will show, however, a much larger quantity of leaf under the action of hydrochloric acid—and, in fact, there was more general growth than by undecomposed bone-dust, though but little tendency to form bulb; yet there is little doubt that eventually, if allowed to mature, the decomposed bone-earth would have given much the largest amount of bulb as well as entire plant.

Sulphuric acid, as the decomposing agent, indicates in every case a considerably more rapid determination to bulb than either the undecomposed earth or that acted upon by the hydrochloric acid; and, excepting where ammoniacal salt is superadded there is a perceptible progression as the amount of acid is increased. Where the ammoniacal salt was used, though the formation of *bulb* is not greater under an increase of acid, there was here, as in the case of the hydrochloric acid, a larger development of *leaf*.

The effect of an equal amount of superphosphate of lime on land ploughed in the ordinary way, or which had been dug 9 or 18 inches deep in the previous year, is here shown;—

Plot Numbers.	Land, how tilled.	Average weight of Bulbs.			
		Drilled Manures only.	Drilled Manures, and 10 cwt. Rape-cake per Acre.	Drilled Manures, and 3 cwt. Sulph. Am. per Acre.	Drilled Manures, and 3 cwt. Sulph. Am. and 10 cwt. Rape-cake per Acre.
12	Land dug 9 inches in 1844 (11 cwt. superphosphate of lime)	1.20	1.39	1.19	1.07
14	Land dug 18 inches in 1844 (11 cwt. superphosphate of lime)	1.30	1.33	1.30	1.19
22	Land only ploughed (11 cwt. superphosphate of of lime)	1.17	1.33	1.06	1.17

Excepting in column 2, the rapidity of bulb-formation is slightly the greatest where the land is deeply trenched, and in the exceptional case a larger development of leaf was found. The land dug 9 inches deep also shows a slight superiority over that which was only ploughed. The differences are not

quoted as offering any adequate advantage for so expensive a process as spade-digging; but the facts themselves help to indicate the character of the conditions required in turnip culture.

We shall next show the result of the yearly supply of *alkalis*, compared with that from a plot (No. 21) which had been drained of them by a course of ordinary cropping, succeeded by the removal of two crops of turnips :—

Plot Numbers.	Description of Alkaline Manures (drilled).	Drilled Manures only.	Drilled Manures, and 10 cwt. Rape-cake per Acre.	Drilled Manures, and 3 cwt. Sulph. Am. per Acre.	Drilled Manures, 3 cwt. Sulph. Am. and 10 cwt. Rape-cake per Acre.
21	400 lbs. calcined bone-dust and 400 lbs. sulphuric acid	1.22	1.41	1.10	1.18
15	400 lbs. calcined bone-dust, 420 lbs. sulphuric acid, and 315 lbs. soda ash	1.11	1.37	1.14	1.10
16	400 lbs. calcined bone-dust, 420 lbs. sulphuric acid, and 220 lbs. magnesian limestone ..	1.11	1.35	1.21	1.14
17	400 lbs. calcined bone-dust, 420 lbs. sulphuric acid, and 470 lbs. pearlash	1.02	1.27	1.16	1.13
18	400 lbs. calcined bone-dust, 105 lbs. soda ash, 74 lbs. magnesian limestone, and 157 lbs. pearl-ash	1.16	1.33	1.18	1.25
	Mean by alkaline supply	1.10	1.33	1.17	1.15

In the first two columns, where, as we shall presently show, the *balance* of organic constituents was more favourable to *bulb*-formation than in the other cases, we find a greater development of bulb in an equal period of time by superphosphate of lime alone, than when the alkalies, either separately or united, were supplied with it. It is remarkable, too, that in No. 17, where *potass* was employed, there is a general inferiority observable. Again, of the several alkaline conditions, that where potass, soda, and magnesia are used together is the best. The differences exhibited are at any rate sufficient to show that there was no advantage derived by the use of alkaline manures in this soil, which had been subjected to an unusually severe exhaustion of them.

We have, indeed, uniformly observed, not only in the case of turnips, but of other plants, that by the direct supply of alkalies no good effect has resulted in the season of the application, though the succeeding crops have apparently, to a small extent, been benefited. It is our opinion that, in the ordinary course of farming, the special supply of alkalies to the soil is exceedingly rarely requisite—and, if ever it be so, they should never be applied in an *alkaline condition* (which seems to be very prejudicial to healthy vegetation), but always supersaturated by acids. Further, alkalies should not be drilled, but should always be sown broadcast, and well incorporated with the soil. In the case of turnips especially is this to be carefully attended to; and, indeed, it might be almost laid down as a general rule, that those manuring substances which take their value as *mere* constituents of the plant (alkalies and organic manures), should be well distributed through the soil; and those which further exercise an influence upon the health and vigour of the plant, such as superphosphate of lime, should be drilled near the seed.

Whether or not superphosphate of lime owes much of its effect to its chemical actions in the soil, it is certainly true that it causes a much enhanced development of the *underground* collective apparatus of the plant, especially of *lateral* and *fibrous* root, distributing a complete network to a considerable distance around the plant, and throwing innumerable mouths to the surface. The extent and direction of the *underground range* of the turnip are at the same time very much dependent on the mechanical condition of the soil; and it is universally known that *tilth* is of the highest importance to the favourable formation of *bulb*. We know that the best relation of bulb to leaf, and, in fact, the best acreage produce of bulbs, is in the lighter soils, where there is comparatively little obstruction to the development of fibrous root, and it is in these that the special efficacy of superphosphate of lime has been most observable. We believe that, if the turnip is to be valued for its *bulb-formation*, the aim of our culture must be, not to increase the above-ground organs of collection (the leaves), but the *underground fibrous roots*.

We shall now consider the effects of "*organic manures*" upon the production of turnip bulb; and the facts that will come before us will tend to con-

firm the views just maintained regarding the essential development of rootlet rather than leaf accumulation, as a means of obtaining the turnip in agricultural quantity and quality.

The results collected below will illustrate some of the effects of "organic manures" upon the growth of the turnip :—

Description of Mineral Manures.	Mineral Manures only.	Mineral Manures, and 10 cwt. Rape-cake per Acre.	Mineral Manures, and 3 cwt. Sulph. Am. per Acre.	Mineral Manures, 10 cwt. Rape-cake, and 3 cwt. Sulph. Am. per Acre.
Mean of entire series of purely mineral manures ..	1.16	1.31	1.14	1.10
Mean of four experiments with alkaline supply ..	1.10	1.33	1.17	1.15
Mean of three experiments with superphosphate of lime	1.21	1.37	1.18	1.13

We may explain that the results in the first column were obtained by means of mineral manures alone, and that, the previous crops having been entirely removed from the land, the organic supplies must have been chiefly derived from the atmosphere. The development of *leaf* was less in these than in any of the other cases. In column 2 there was, besides these same mineral manures, 10 cwts. rape-cake, which may be estimated to provide perhaps 50lbs. of nitrogen. It was, however, employed in these experiments as supplying a large amount of carbonaceous matter, in which it abounds. In the 3rd column the effects are due to the addition of 3 cwts. of sulphate of ammonia to the mineral manures. In these cases about 60lbs. of nitrogen is supplied, but no carbon. In the 4th column we have the effects of the addition both of the rape-cake and of the ammoniacal salt to the standard mineral manure; consequently the supply of nitrogen by manure would amount to about 110lbs. per acre.

It is seen that, whichever mineral condition be taken, the supply of carbonaceous matter has given the largest bulb. Of the two mineral series, the acid and the alkaline, the former exhibits a general superiority in each case, excepting in the 4th column, where the defect is very trifling. In this case, notwithstanding there was a carbonaceous supply equal to that in column 2, the excessive amount of *nitrogenous* matter has prevented a favourable formation of bulb. These mean results clearly show that carbonaceous rather than nitrogenous organic supply is favourable to *bulb-formation*, and the fact is confirmed by the following individual cases :—

Plot Numbers.	Selected Results. Description of Drilled Manures.	Drilled Manures only.	Drilled Manures, and 10 cwt. Rape-cake per Acre.	Drilled Manures, and 3 cwt. Sulph. Am. per Acre.	Drilled Manures, 10 cwt. Rape-cake, and 3 cwt. Sulph. Am. per Acre.
18	Superphosphate of lime, with potass, soda, and magnesia	1.16	1.33	1.18	1.25
19	As No. 18, and 1 cwt. sulphate of ammonia ..	1.16	1.24	1.02	1.09
20	As No. 18, and 3 cwt. rape-cake	1.28	1.40	1.18	1.18

In all these cases the mineral manure was the same; and in all, the 2nd column under the cross-dressing of rape-cake shows the best result. Further, looking at each column separately, we find that No. 20 always gives a heavier bulb than No. 19, and, excepting under the cross-dressings of ammoniacal salt, than No. 18 also. The amount of the differences is not indeed great; but when we remember that the results are calculated from nearly 2000 plants in each case, their uniformity and constancy demand that reliance should be placed in them. It is clear, then, that carbonaceous manures aid the development of turnip *bulb*. We shall give one more quotation on this subject :—

	No. Cross-dressing.	Cross-dressed by 10 cwt. Rape-cake per Acre.	Cross-dressed by 3 cwt. Sulphate Ammonia per Acre.	Cross-dressed by 10 cwt. Rape-cake, and 3 cwt. Sulph. Am. per Acre.
No drilled manure (third season)	0.11	0.67	0.07	0.50

The instances before us are of high interest in many points of view, but we are not prepared to consider them fully until we have detailed the results of an analytical examination of the crops—a subject which we shall presently enter upon. Resuming the question in discussion, we see that whilst ammoniacal salts in no degree restored fertility to this exhaused soil, rape-cake gave a sixfold development. In the 4th column, under an equal amount of rape-cake, we find as usual that the excess of nitrogenous manure has deteriorated the tendency to bulb formation exhibited in column 2.

The contrast observed in the effects of ammoniacal salts upon wheat and upon turnips is very remarkable, and affords a striking illustration of the widely differing requirements and sources of growth of the corn-exporting "white crops" and the home consumed, meat-producing "green" or "fallow crops," of which classes respectively the two plants may be considered as the types.

Hitherto we have only considered the effects of organic manures upon the formation of turnip *bulb*, the amount of which is thought to determine the value of the crop when cultivated for feeding and rotation purposes. It has been seen that a liberal supply of available phosphates and of organic manures abounding in carbonaceous matter are pre-eminently favourable to the desired habit of the plant, and that nitrogenous supply, so essential to the increased growth of corn, is so here only to a very limited extent. Under the influence of ammoniacal manures, however, the production of turnip *leaf* is much enhanced, as the following results will show:—

Description of Manures.	Bulb per Acre, in				Leaf per Acre, in				Proportion of Leaf to 1000 of Bulb.
	tons	cwts.	qrs.	lbs.	tons	cwts.	qrs.	lbs.	
Mean by purely mineral manures	12	8	2	3	4	4	0	14	326
Mean of mineral manures, with 10 cwt. rape-cake added	13	4	2	20	5	12	0	21	421
Mean by mineral manures, and 3 cwt. sulphate of ammonia added	11	18	1	24	6	15	0	21	559
Mean by mineral manures, and 3 cwt. sulphate of ammonia (second gathering)	12	5	0	13	5	14	0	17	466
Mean by purely mineral manures, and both rape-cake and ammoniacal salt	11	6	1	11	7	9	0	22	669
Mean by purely mineral manures, and both rape-cake and ammoniacal salt (second gathering) ..	12	4	3	6	6	15	2	16	554

Thus comparing lines 1 and 3, we find that whilst, by the addition of ammoniacal salt in the latter case, there is in an equal space of time half a ton less of bulb, there is an increase in leaf by 2¼ tons; and, as shown in the 3rd column, the proportion of leaf to bulb is more than half as much again. Taking lines two and five, the addition of ammoniacal salt, as in five, gives nearly two tons less bulb, but nearly two tons more leaf, the proportion of leaf to bulb being again increased by one-half. The gross produce is seen therefore to be greater in one of these cases, and as great in the other, under the addition of ammoniacal salts. We have before remarked, however, that whilst at the time of gathering, the crops by mineral manures alone, as in line one, had probably more than fully arrived at maturity—the leaves having drooped and changed colour—those under rape-cake addition only had but just attained full growth; and those having ammoniacal salts, as in lines three and five, evidently possessed yet unexhausted vitality, especially in No 5, the case where rape-cake was also supplied. It might be supposed, therefore, that in due course bulbous development would succeed as the increased leaves drooped. The results of the second gathering, taken when the leaves under

ammoniacal salt without rape-cake had considerably fallen (those with it being still vigorous), show this to have been the case to a greater or less degree. A comparison of lines three and four shows an increase of bulb in three weeks of 7 cwt., at the expense of 19 cwt. of fresh weight of leaf. On the other hand, line six gives an increase in the same period of 18½ cwt. of bulb, at the expense of only 14½ cwt. of fresh leaf. Under ammoniacal salts alone there had therefore been an actual depreciation in fresh weight, indicating at least a loss of vitality, though there was probably no real loss of solid matter. Where there was rape-cake also, however, we find an actual gain in gross weight, and we had undoubtedly a vitality and resource of growth still unexhausted. Comparing line four with line one, the latter has still the largest weight of bulb; and comparing line six with line two, the former is still a ton in advance. Were we to admit, however, that if the crops could have been taken at the stage of its best yield of *bulb*, there would have been a slight superiority under the nitrogenous manuring, the quantity yielding the effect in these instances could in no form have been economically obtained, even were there no other objection to its use.

The effects of an excess of nitrogen in tending to an unprofitable habit of the plant are further exhibited in the following table:—

	Bulb per Acre, in				Leaf per Acre, in				Average Weight of Bulbs.	Proportion of Leaf to 1,000 of Bulb.
	Tons.	cwts.	qrs.	lbs.	Tons.	cwts.	qrs.	lbs.		
12 tons farm-yard dung..	17	0	3	6	7	7	3	2	1·61	433
12 tons farm-yard dung and 3 cwt. sulphate of ammonia.....	14	18	3	12	10	8	3	12	1·45	700

It is here seen that whilst farm-yard dung, itself containing some nitrogen, and certainly a very full allowance of carbonaceous matter, gives 17 tons of bulb, we have more than 2 tons less bulb when ammoniacal salt is superadded; but there are at the same time 3 tons more leaf than by dung alone. The third column shows that the actual size of bulb, as well as its acreage produce, was less, under the excessive supply of nitrogen; the fourth, that under the same circumstances the proportion of leaf to bulb was increased by more than one-half. So far as supply of *constituents* is concerned, we could select from the series of experiments several instances where we may reasonably suppose that every constituent, excepting *carbon*, existed more fully in quantity and more favourably in combination than in the dung; yet with its larger *carbonaceous supply to the root* we get the largest crop of bulb in the series. The excess of nitrogenous manure, however, is seen greatly to enhance the leaf-forming tendencies of the plant, which it is true may probably aid carbonic-acid accumulation from the atmosphere, but at the same times gives a less profitable appropriation of the resources within the soil; and we shall afterwards see it to be by no means clear that there is with a large production of leaf a proportional *gain* of nitrogen from the atmosphere.

Admitting, then, that the organic manure required for the growth of turnip *bulbs* should be carbonaceous rather than nitrogenous, there is still evidence that, under the influence of a due provision of nitrogen, the vitality or longevity of the plant is greatly increased: and since the turnip crop is required to brave the winter frosts, an early and perfect ripening, such as would be induced by a defect of nitrogen relatively to carbon, whilst it might be coincident with a more *rapid* bulb formation, would by no means be a desideratum. We believe, however, that in the ordinary course of farming, the special supply of nitrogen to the turnip crop by means of artificial manures is seldom, if ever, necessary; for there is no ample source of available carbon which does not provide at the same time a considerable amount of nitrogen. As, therefore, in the case of wheat we need not study the supply of carbonaceous manures, so, in the case of turnips, it comes to be unnecessary to devote special care to the provision of nitrogen. In the one case the means adopted specially to secure nitrogen to the soil brings with it enough of carbon, and in the other the peculiarly carbonaceous manures are associated with sufficient nitrogen.

We have argued that for the growth of turnip-*bulb* a soil is required in such a mechanical condition as shall render it easily permeable to the atmosphere and to the fibrous roots of the plants; that healthy action and a tendency to development of very extended underground collective apparatus should be induced by the use of the so-called "mineral manures," these never being in an alkaline state, and always containing a considerable

quantity of phosphoric acid easily available to the plant; that after the early stages of the plant are passed, its rapidity of growth depends upon an abundant provision *in the soil* of constituents for organic formations, especially of *carbon*; that nitrogen must be provided by cultivation, though seldom by special manures; and lastly, that all these requisites being provided by the farmer, the degree in which his efforts will be availing depends essentially upon certain climatic conditions, comprising a considerable *continuity* and *amount* of rain as a means of taking up the stores of the soil, keeping up a vigorous circulation in the plant, and supplying the dissolved gases of the atmosphere.

These conditions, compared with those which are required in the culture of wheat, are opposed to one another in almost every particular; but as we proceed we shall see that of the observed differences much is doubtless due to the essential distinctions between the tendencies of the natural families to which the plants belong; yet much of it is also attributable to the fact that in the case of the turnip it is not the seed that is the object of our culture, but a monstrous accumulation which could only take place under a somewhat unnatural or artificial balance of the constituents of supplied food, and under such a condition of climate as should be adverse to seed-forming.

It is known that where the turnip is grown for its natural seed product, oil, a heavier soil, richer manuring, and, during a considerable period of the growth of the plant, a much higher temperature, are required than when the bulb is to be produced. Under these circumstances there will be much less fibrous root thrown up to the surface—the root is scarcely bulbous, but fusiform, tapping rather than spreading laterally; the leaves and stem are much larger, both actually and proportionally to the root, and the organic manures should contain more nitrogen and less carbon. Were we then to cultivate the turnip for its most natural products, the treatment it would require would much more nearly approach that adapted for wheat than at present; the deviations from it now observed, and which have been referred too exclusively to the *natural* specialities of the plants, would be greatly lessened, and the character of the plant as a "*fallow crop*" would be lost. It is no objection to this assumption that in selecting plants to transplant for seed *from which to grow bulb*, those having the most symmetrical bulb are chosen rather than such as are more fusiform, and betray a more abundant seed-forming habit; in this case it is not the most abundant natural seed that is the object of culture, but a seed having a special habit of growth, which habit it is wished to propagate.

There being an evident understood subserviency of the leaf of the turnip to the bulb, and a sort of succession in the order of maturation of these different organs, the latter not being perfected until the former has lost much of its succulence and vigour; this fact, and the special conformation of the plant, as before adverted to, have, in theory, led to an appreciation of forcing a large amount of leaf, which is not consistent either with the full efficiency of the conditions which our researches show to favour *bulb* formation, with the character of the soils best suited to the growth of the turnip-bulb, or that of the plant which is most approved by the practical agriculturist. It is true that relatively to wheat and many other plants, the turnip exhibits a large surface of succulent leaf, which, it is admitted, indicates a greater reliance in one way or other upon the atmosphere; yet all experience, when judging not between the turnip and other plants, but between one turnip and another turnip, values the one in which the proportion of leaf is least and the tendency to bulb the greatest. The description of soil which is called a turnip-soil, again, is just that which is best adapted to formation of fibrous root, and that which always yields a proportionally small amount of leaf. Moreover, the soils which yield the largest amount of leaf are known not only by their general mechanical condition, but by their comparative richness in nitrogen, to be exactly those in which the results of our experiments would lead us to anticipate that the leaf-forming tendency would predominate. In these, too, as compared with the lighter ones, an excess of nitrogen in the manure is the more likely to give an undesirable development, for in the latter any increased vigour of growth arising from nitrogenous agency may more easily extend the *underground* organs and determine to bulb formation than in the former.

(To be concluded in our next.)

KOHL RABI.

SIR,—I see that Kohl Rabi is attracting a great deal of attention: I have heard Mr. Hewitt Davis's account of it, and fully agree with all he says on the subject; and I can add that horses are fonder of it than any other root. I have sown it in drills exactly like turnips, so late as the 16th May, and in that case it did not come up till a month after, and the crop was excellent. If any cattle stray into the fields, they are certain to eat it first; and as for hares, they will touch nothing else till it is eaten up. The best account of it is in the 7th vol. of the Bath Society's Transactions, by the Rev. Thomas Boughton.

The following rules are very simple for its management:—Set up your turnip drills twenty-seven inches apart, manured in the Northumberland fashion, and sow 4lbs. per acre, and thin them out to at least twenty-five inches in the rows; and the thinnings of an acre will plant at least a dozen more, if

you like. The sooner this is done in March the better; but it may be sown much later, say the 20th. of May. The produce, I think, will be about the same as swedes; and for the following reasons it is far superior even to that valuable root—

1st. Cattle, and horses especially, are fonder of it.
2nd. The leaves appear excellent food.
3rd. It bears transplanting better than any other root.
4th. It stands the winter better than swedes generally.
5th. It stores quite as well, or better.
6th. Insects and grubs never injure it.

I have seen it in the German markets, where it is largely sold as a vegetable for the tables—about 3lb. weight on the 21st June—in that case I think it must have been sown in the previous autumn; perhaps you can put me right on this score, as I have as many plants in a seed bed as would serve for ten acres.

So high is my opinion of it, that if I was confined to have only *one* root on my farm, I would choose it in preference to all others; as it is, from my experience, the surest crop of any. Every prudent man, who wants to guard against the total or partial failure of his turnip crops, should have at least one-fourth of his fallows planted with it. In some parts of Yorkshire a crop of it would have been exceedingly valuable, where the turnips failed this year; and you can transplant it on to the stiffest and wettest clays, where turnips can never or rarely be got: and last, but not least, the wettest weather in May is the best time to transplant it in.

The purple and light green kinds are the best bulbs. If eaten raw the taste exactly resembles the heart of a cabbage stalk. A FARMER.

—Mark Lane Express.

ON DRAINING.

[We invite attention to the following paper on the subject of drainage, addressed to the chairman of the London Farmers' Club, and would have been read at the discussion at the last monthly meeting had opportunity been afforded. The writer is well known as an experienced practical farmer, who has adopted "practice with science" as his motto.—ED. F.M.]

Finding it out of my power to attend the meeting of the club, and feeling the vast importance of the subject, I beg thus, through you, to offer a few practical remarks, which I hope you will be allowed to read when it suits you during the discussion.

I will divide strong soils and their subsoils into all the descriptions with which I have come in contact in my experience (in Scotland, Ireland, and for the past eight years in this country), namely, four classes.

Firstly. Strong clay soil, resting upon a main bed of retentive clay in the Oxford blue lias and London clays, &c.

Secondly. Strong soils resting upon a clay subsoil, with occasional beds or stratas of open porous rock, ramal, gravel, or sand, or any other porous material crossing out through it.

Thirdly. Strong soils resting upon a hard conglomerate or mixture of clay, gravel, and sand, perfectly impervious to water.

Fourthly. Strong soils, resting upon a thin clay subsoil, resting upon an open porous rock or other porous material.

In the first or strong soil, upon a strong clay subsoil, I have invariably found that the drought or sun-cracks (caused by dry summers) have descended from three to four feet in depth; therefore, in the operation of digging the drains in this description of subsoil I have always found that the water continued to come in at the bottom until the drain got about three and-a-half feet deep, when the water generally came in a little above the bottom, and ran down the side to the bottom, showing that the sun-cracks are the cavities or fissures through which the water percolates down to the drain. Therefore I think a good rule, as a guide to the proper depth in such soils, is to sink your drains until the water begins to come in a little above the bottom of the drain, for if drains are made much deeper than these cracks go, it will be necessary to fill the drain up with porous material to the level of the bottom of these cracks. I have always obtained perfect dryness in this description of land by placing the drains as many feet apart as it was inches to the bottom of the drain when made by the before-mentioned rule.

Upon this principle I have drained all the strong land of my own farm, which I now farm without a furrow to carry off superfluous water, and I have never seen any water run off, although some of the hills rise at about an angle of twenty-five degrees; which proves that when draining is done upon proper principles, it is not necessary to dress land up in the suit of corduroy Mr. Mechi finds so indispensable in conjunction with his system of draining at Tiptree.

I have remarked, that where strong land has been thrown up into high-backed lands or ridges, that in draining across them there has invariably been little or no water at the furrow, but a great quantity in the ridges, showing that the land was porous under the ridge, but impervious, or nearly so, under the furrows. To find a reason for this I was for some time at a loss; but I fancy I got at it after some consideration. The reason, I believe, is, that after the dry weather of summer has cracked the land, then the winter rains filling these cracks up to the level of the furrow, and then the superfluous water running down the sides of the ridges, carries an amount of sediment with it, which becomes deposited in the cracks at the furrow, filling them up and displacing the water. This also accounts for the soil being as deep at the furrow as at the ridge. I have found the best way of draining these high-backed lands, has been to plough them down very deep, and put a drain in the middle of them—attending to the before-mentioned rule—which will lay the furrow as dry as the ridge.

I have been able, after draining upon these principles,

and deeply cultivating and well manuring, to produce as good crops as can be grown upon the best naturally dry loamy soils.

I now come to the second description, viz., strong soils resting upon a clay subsoil, with beds or stratas of open rock or other material crossing up through it occasionally. Now as these stratas of porous material will act as drains to whatever depth the water is drawn from them, either by natural or artificial means, it is evident that if those open stratas are sufficiently frequent, that the simple means of draining this description of soil is to run a very deep drain across these stratas (which almost invariably lye across the fall of the land, therefore the drain should run perpendicular up the hill), and if possible to the full depth of these stratas, by which means a single drain will often drain an incredible quantity of land.

But in many cases these open stratas are few and far between; therefore it is necessary to drain in part as in the first description of strong soils, and run an occasional very deep drain to take all the water out of the open stratas that do exist. It also often happens that these porous stratas are not sufficiently open to drain a long distance, therefore it is necessary to make deep drains more frequent. Of these and the first class of strong soils and subsoils there are a great extent in the midland counties.

I now come to the third description of strong soil resting upon a retentive conglomerate of clay, gravel, and sand. Perfectly impervious to water, this is of all other soils the most difficult to perfectly drain; first, because it is the most expensive to sink the drains in; secondly, because the drains must be frequent; and thirdly, because the subsoil must be rendered porous by art, or it will be a long time before the land will be perfectly dry.

In this description of subsoil the drains should not be less than thirty inches, nor more than forty in depth, as the drain must be filled up to within that depth of the surface with some porous material, as it is intended to stir the subsoil, and render it porous: and it is necessary the distance between the drains be only a yard for every five inches the drain is in depth. It is on this description of soil that the greatest benefits have been derived from deep ploughing and subsoiling, because the deeply breaking up increases the porosity of the soil, and enables the drains to act more perfectly. I have a relation who occupies a large portion of this description of soil, which in its natural state was only let for a few shillings per acre, although within four miles of Glasgow, and although receiving an immense quantity of dung, produced bad crops: but since it has been drained from thirty to forty inches deep, and filled with the porous surface soil up to within two feet of the surface, to which depth he has moved the soil by the first plough going fifteen inches deep, and the subsoil plough nine more, and then applying a liberal dressing of good dung, he has obtained as good crops as can be grown on any soil in the kingdom: but recollect, he has a nineteen years lease, to be renewed two years before expiring, if he and his landlord agree.

I now come to the fourth and last description of strong soil, resting upon a bed of strong clay, under which lies a bed or strata of open rock, or other porous material.

If the bed of clay does not exceed five or six feet in depth a drain taken as deep as possible into the under strata of open material will make all perfectly dry; but if the bed of clay is more than six feet, or such a depth as the deep drain does not lay it dry, it must either be drained according to the rule before laid down in Class 1, or by boring holes with an auger down to the porous materials below, every square pole, minding to make the holes of the second row opposite the centres of the division between the holes of the first thus: * * * * * * * then filling these holes with sand or fine gravel, or long straw stuffed down lengthways, in the same way that collar-makers stuff horse-collars, or engine ashes or any other porous material that will act as a conductor of the water, down to the porous material below. Of this description of soil there is a good deal in the midland counties over the limestone rock, and in Ireland a great deal over a limestone gravel; but the fall is generally bad (in that country) for getting drains deep enough to be as perfect as should be.

There is another description of this subsoil with a moory or peaty sandy soil on the surface, with a hard conglomerate a few feet deep, with an open strata of rock, gravel, sand, or other open material below it which is often naturally dry. I have known great tracts of this laid dry merely by subsoil ploughing a great depth where the retentive strata was not very thick. But where it was thick and could not be bored with an auger, long holes were dug down to the open material (which if not dry was made so by a very deep drain), then in each end of these long holes was placed a faggot standing endwise on a plank placed standing on its end a few inches from each end, and stones or gravel, or any other porous material, put between it and the ends, filling in the rest with what came out. These holes should be in rows six or seven yards apart, and two yards long, and six or seven yards from the end of one hole to the end of the next. It should also be observed to place the holes of the second row opposite the unmoved part of the first, and so on. The open material that is put into the end of these holes should come up to where the subsoil plough will reach; but if the retentive soil on top is very thick, the best way will be to drain as recommended in class third.

I have now, sir, in as few words as my ability will permit, given you a detail of what I know about draining these soils from my experience in all the three kingdoms. But I would not advise any man to throw any temptation in the way of honest, honourable landlords, by giving them a chance of appropriating these improvements to his advantage, by simply having his estate fresh qualitied, and a per-centage put on their own capital sunk in such improvements, whereby just landlords' characters often are vilified by the actions of unjust valuers, so that three men are injured—two in character and one in purse.—I am, Mr. Chairman and Gentlemen, yours most respectfully, PETER LOVE.

YORKSHIRE TURNIP-GROWING AND CULTIVATION.

BY M. M. M.

The cultivation of turnips is so essential to good husbandry, and serviceable both as a fertilizing crop and a nutritious means of support to all kinds of stock, far surpassing every other cultivated plant, that the knowledge of their successful cultivation is one of the most important acquisitions to the practical agriculturist; and as that knowledge depends rather upon an acquaintance with the successful modes of cultivation actually in operation by practical men, than by any new theory of cultivation ill adapted to the generality of soils, the object of the writer shall be, in accordance with the society's condition, to describe the mode of cultivation employed by practical farmers in an extensive and important district of country, and on a somewhat varying soil.

The district selected the writer is well acquainted with, and is situated in the North Riding of the county of York, and comprises a considerable portion of the wapentakes of Birdforth and Hallikeld. A general idea of the district may be given by naming the principal parishes contained in it: Sinderby, Ainderby, Sand Hutton, Carlton, Sowerby, Catton, Skipton-on-Swale, Baldersby, Asenby, Rainton, Dishforth, Marton, Brafferton, Sessay, and, in general, lying between the great North of England Railway and the celebrated Roman road, Leeming-lane, bounded by Hang East Wapentake and the West Riding, and containing 23,520 acres.

The soils lie upon the new red sandstone, and contain patches of red, friable clay, and gradations varying from deep red loam to white, grey, and yellow sand—the latter two varieties comprise the greatest portion; the subsoil generally sandy, interspersed, however, with more impervious strata, and with beds of gravel, partly naturally dry, but in other tracts abounding in land-springs. The district is generally underdrained in all situations where it is necessary, some parts in a scientific and efficient manner, and others less perfectly.

The crops of turnips are good in the general run. Twenty tons of bulbs per acre are considered an average produce.

The district has for the most part been long under turnips; and certainly the growing luxuriance of former years, when they were a "novelty crop," has gone by, and it requires very careful and indeed stimulative cultivation to preserve a full crop. Still, although turnips are, if wholly removed from the soil, a very impoverishing crop, they are, when consumed upon the soil, a most enriching one; and hence the district has gradually improved both in corn and stock-producing character, though a little more attention and care are requisite to secure a full and vigorous crop.

The crop usually preparatory to the crop of turnips is wheat, following clover-seed pasture.

The stubble is ploughed once, usually in the autumn, from the middle of October to the latter end of November, in order that it may be exposed to the meliorating influence of the winter frosts. Be the soil deep or shallow, the general object is to plough either as deep as the soil, if it be shallow, or at least to plough six or seven inches deep, if the soil be still deeper. In the latter case, a new soil is turned up every turnip crop, and less difficulty prevails in obtaining a crop in such a case than in any other. On the very light portions of the district the farmer is careful of bringing up too much of the sandy subsoil; and hence the plough-furrow is much thinner, and generally such soil is exceedingly wild and foul with couch-grass. In such cases, where the soil is very poor, the turnips succeed the seed-pastures. This is denominated "giving the land a crop," and it is almost invariably the case that a good crop of turnips follows this course, simply because the land is all the richer for the corn crop not being taken before the turnips. This practice is very common in improving the poorest sands recently reclaimed by draining, and is a very successful one, but at the expense of the rapid deterioration of the seeds in future crops, of which the soil becomes sick by repletion. Cross-ploughing is the next process to which the land is subjected, and usually takes place in March, or so soon as the furrows are sufficiently dry to admit of the plough working freely. In land very wild this is often delayed until April, lest the weeds should be broken in pieces by the plough acting on the soil already consolidated by the moisture it contains. Soon as the surface becomes dry, a pair of patent harrows are put upon the land to bring the weeds to the surface, and loosen them from the soil.

The peculiarity of the patent harrow is its having a hinge in the middle, and it thus tears the weeds from the soil much more efficiently in this stage than any loose harrows could effect.

Four to six times are given with these harrows; first laterally, and afterwards across, and so on al-

ternately until the weeds are loose upon the surface, when they are raked off by women, and generally burnt. This practice, though all but universal, is most wasteful and objectionable. The weeds, if carted to a mixen, turned and mixed with a small portion of hot horse-dung, forms a mass of decomposed vegetable matter exceedingly valuable to the crops of the succeeding year. If the couch is very abundant, a second ploughing and harrowing are given; if not, the patent Finlayson's harrow is passed over the ground, and is an implement so efficient that few good farmers in the district are without one. The peculiarity consists of working steadily, and it is a uniform depth, capable of being extended almost indefinitely, of throwing up to the surface the whole of the weeds the teeth meet with, by a semicircular head on the top of the teeth, and of these being capable of being elevated entirely out of the ground at the turnings of the horses, and are thus a material diminution of the draught. After every dragging the weeds are raked off; and in friable soils the ploughing and harrowing with Finlayson's harrow alternate; in others, the harrowing passes twice for the plough once. This process is continued until the weeds are so small as to resist the operation of the harrows, and slide between their tines: recourse is then had to hand-gathering—a somewhat tedious and unpleasant operation, but invariably performed by women.

So soon as the land is cleared of weeds, the preparations are made for manuring—an operation which varies just in proportion to the mode of sowing adopted, the whole of which I shall pass in review. Manure for turnips generally consists of the following, either alone or combined as stated: Farm-yard manure, fermented; ditto, with bones; bones, alone; dissolved ditto, with ashes; lime and fermented manure; bones and lime, on peat; pigeons' dung, rape-dust, night-soil, &c., are used as auxiliaries in some few instances to the whole of these manures.

We shall first advert to manure. The manure is usually made in winter by the horses and cattle, consuming straw with corn in the former, turnips or cake in the latter case. It is carted out in January, February, and March, to the field, and then turned once or twice, as the fermentation proceeds rapidly or sluggishly; and in every case it is in a rotten state before it is applied to the turnips. Experiments have been made in the district with unfermented dung for turnips, but it has failed in every instance. The simplest mode of applying the manure is in ridges, and is practised on the strongest soils in the district, on the extreme light soils, and indeed in every case when, from any cause whatever, the soil is ungenial to turnips. The ridges are usually made by the double mould-board plough, eighteen inches apart in the furrows. Ten to twenty tons of such fermented dung are deposited by being spread from carts, which just span the ridges with the wheels. A double mould-board plough follows and closes the furrow, replacing the soil upon the manure, in order to keep in the whole of the moisture. A boy usually follows with a Scotch drill, preceding a light roller, one end of which flattens the ridge for the drill; the other passes over the drilled ridge, and covers the seed.

The Scotch drill is simply a cylinder perforated with semi-circular holes, and which, revolving, deposits the seed each hole contains. This mode is generally adopted for swedes, where manure only is applied.

A primitive kind of drill is getting much into use to drill short manure, called the "sledge-drill;" and nothing recommends so rude a construction but its saving of manure. It consists of a large hopper, to the edge of which, and immediately over the funnels, is fixed an iron rod, from which a series of iron prongs project. A man with a hoe pulls the manure over the prongs, which revolve, and deposit it and the seed in a furrow about two-and-a-half inches deep. A brush follows. Not more than eight or ten tons of manure are usually applied by this drill. This is named not in commendation, for the crops are generally light by this process, but in order distinctly to state the practice in the district.

The next and most general process in use is a combination of manure and bones. The manure is usually applied in the early part of June, or earlier if the soil be sufficiently cleared, and ploughed in to mix with the soil. The quantity usually applied is fifteen tons per acre. The soil is allowed to rest till sowing-time, to accumulate moisture and allow the root-weeds to germinate. At sowing-time three ploughs, or according to the breadth the drill covers, are put in motion. A pair of harrows, and the Suffolk drill follow, completing the field at the rate of twelve acres per day. The drill consists of a receiver for the bones, in a pretty acute angle: and they fall upon revolving semi-circular iron teeth, which distribute the bones in the funnels that convey them to the indentations made in the surface by the coulters affixed to the drill. The seed is thrown out in cups, and so contrived as to drop immediately on the bones. The bones are usually half-inch; and the quantity applied is twelve bushels per acre. The drills are fourteen inches apart. On all genial soils this mode succeeds probably the best. A great desideratum is, allowing the soil to retain the moisture in a dry season, and thus expediting the germination of the turnips. It economizes the bones, and places them in a position so as to afford the nourishment

to the plants the moment they germinate. The nitrogen supplied by the bones stimulates the plants in the early stages, and thus enables them with more energy to absorb the carbon given off by the manure previously in the soil. The plan almost invariably succeeds in producing a full crop of turnips.

Lime is occasionally used with manure. In this case the lime is generally carted to the soil in May, at the rate of a hundred bushels per acre, quick (caustic), placed in small heaps, which remain to be dissolved by the air, or in other words converted into carbonate of lime by attracting carbonic acid gas from the atmosphere. Caustic or hydrate of lime is found to remedy the fingers-and-toes in turnips.

In some cases, where the land is wild, and time valuable, the lime is slaked by water, and converted into hydrate by absorbing the hydrogen from the water.

The lime is then spread, and the land receives two or more ploughings to incorporate the lime gradually with the soil. The manure is then spread upon the surface, and ploughed in. A drill is affixed to the plough, and deposits the seed in the interstice of every furrow, usually eleven inches apart. A light harrow covers the whole. Much has been said on the impropriety of mixing lime and manure at so short an interval, and much in condemnation. Experience in the district decides that excellent crops of turnips have followed; for admitting the lime to neutralize, by rendering insoluble, certain parts of the manure, it also decomposes some that it finds insoluble in the soil, being so rich in carbonates for the plant, and being so much fresh or virgin earth, unexhausted or uneliminated, be it one or the other, and being the receptacle of cultivated plants.

Bones and lime have been applied, the latter by the Suffolk drill; but the success has been far from such as to encourage the process, except on peaty soils.

In some cases bones are drilled on ridges, already filled with manure, as above described, and some by a harrow drill, similar to the Suffolk drill, but having but one coulter, and drilling but one ridge at a time. This mode is usually employed for swedes, partly because they require an extra allowance of manure, and partly because they are generally pulled off the ground.

Occasionally pigeon's manure is substituted for bones, and is equal in value to bones, being one of the most concentrated fertilizers the agriculturist possesses.

Night-soil is usually applied to swedes in the ridges. Its effects are most decided in producing large and vigorous plants; but guano, as a general dressing, exceeds every other.

Rape-dust is sometimes used if bones are scarce, and in a wet season is found successful. The turnips, however, never attain a very large size if this only is used.

Animalized carbon has been tried to a small extent, and found useful, though in most cases inferior to bones.

Turnip-sowing generally commences by the 12th of May, near which time the swedes are generally put in. If, however, the state of the land does not admit of their being sown so early, swede-sowing goes on until the first week of June, after which few persons attempt to sow them. General operations commence on the 21st of June, and by the 30th are almost invariably completed. So active are the operations during the week after the 21st, that in this district it is actually a more stirring time than harvest. If the sowing is much earlier than this date, the turnips are liable to run to seed before they are broken, and generally grow hollow and innutritious, though they attain a larger size, besides being much more subject to weeds, which naturally germinate in the early part of June. If the sowing is delayed until July, the crop is invariably small, as the weather is more favourable to the maturation than the development of plants at that period. The quantity of seed sown varies from one and a-half to three pounds per acre. Two pounds of seed is perhaps the most usual quantity. Good farmers prefer a full allowance of seed; for though the more plants, the greater difficulty arises in hoeing, still a full plant excites rapid growth in the early stages—an object always most desirable, provided they are thinned before they arrive at a degree of maturity to abstract much of the nourishment supplied to the plants.

The "white Norfolk" turnip is sown invariably for a general crop, and is the most certain and easiest cultivated. The "Dale's hybrid" is very generally substituted for the swede in a limited extent, and as a succession turnip, and is a very useful spring turnip, obtained with lighter cultivation than the swede, and being well relished by stock. The "yellow Aberdeen" is a much admired turnip by many farmers, is succulent to a late period, and, by burying itself in the ground, resists a great degree of frost. The "purple-top" is a little sooner, and is gaining ground as a hardy variety.

The operation of hoeing commences about three weeks after the sowing of the seed, should the weather be propitious. The hand-hoe is invariably used, and for thinning; and the plants are set at nine inches apart. The whole of the ground is hoed over as well, whether there are weeds or not.

When sown in ridges, a pass of the horse-hoe between the ridges is given, which saves one-third of the labour, and destroys the weeds much more effectually, being a semi-fallow to the soil between the ridges. This operation is sometimes performed twice. In cases where hand-hoeing only prevails, a second hoeing is given about three weeks after the first, and the weed only cut up; for the first characteristic of good hoeing is considered to be, not to leave the plants together, and not to have a plant to take out the second hoeing.

The writer has had several communications on the results of several applications to turnips; and the care with which they were conducted gives them every degree of confidence.

No. 1.—Soil, light gravelly; subsoil, gravel.

	Per acre. ton. c.
Swedish turnips, 4 cwt. of guano	24 0
Swedish turnips, with salted farm-yard manure	21 10
Imperial yellow turnips, guano as above	22 0

No. 2.—Soil, retentive clay, drained and subsoiled.

	Per acre. ton. c. qr.
30 bushels of bones	26 3 1
3 cwt. guano, and 15 bushels bones	34 2 1
4 cwt. guano	30 16 0
40 tons farm-yard manure	33 15 1

No. 3.—Soil, clay.

	Per acre. tons.
6 cwt. guano	24
10 cwt. rape-seed	22
10 cwt. bone-dust	22

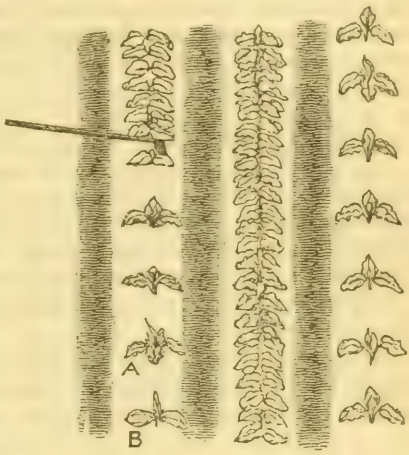
No. 4.—Soil, peaty moss, drained.

	Per acre. ton c. q.
Ammoniacal salts	7 3 1
Bones and sulphuric acid	14 10 1
Guano	14 19 2
Ammoniacal salts and guano	18 1 2
Farm-yard dung, *double cost*	22 6 3

The writer thinks the above experiments contain elements of much value; and as so much depends on large and healthy crops of turnips, he trusts they will be well considered.

A turnip-hoe for singling out the plants, much approved of, is given below:

The following sketch will give an idea of the operation of hoeing:



No. 1. No. 2. No. 3.

No. 1 represents a row of turnips partly hoed, the distance between A and B being 8 inches; No. 2 a row unhoed; No. 3 a row finished hoeing.

Sowerby, Thirsk, March 1.

LONDON FARMERS' CLUB.

MONTHLY MEETING OF THE COMMITTEE OF MANAGEMENT.

MONDAY, March 6.

Present—Messrs. W. Anderson, J. Beadel, W. Bennett, W. Cheffins, W. Gray, W. Fisher Hobbs, W. Hutley, C. W. Johnson, T. Owen, W. Purser, W. Shaw (of the Strand), W. Shaw (of Northampton), R. Smith (of Burley), R. B. Smith (of Edmonton), J. Thomas, and Jonas Webb. R. SMITH, Esq., in the chair. The minutes of the last Meeting were read and confirmed, and signed by the chairman of this day.

The following gentlemen were elected members:—

Bales, H., Ely, Cambridge; Freeman, J., Weasenham, Norfolk; Gandell, G., London; Marshall, G., Godalming, Surrey; Newington, S., Knole, Kent; Sherborn, F., Bedfont, Middlesex; Trumper, J., Southall, Middlesex.

The names of eight other gentlemen, proposed as members, were read for the first time.

A variety of other business was transacted, and the Committee broke up a little before 5 o'clock for the discussion.

There was a Tenant-Right Committee of the Club held previous to the General Committee Meeting.

HEDGEROW TIMBER.

The sanitary condition of a question is dependent (like our atmosphere) on its proper and occasional agitation. Storms are said to do good; but I prefer, for many reasons, a temperate and yet refreshing breeze. When I read, in your late number, Mr. Vernon Harcourt's voluminous communication, calling me (there could be no mistake as to the person alluded to) "an agricultural radical," "a vulgar and agricultural fanatic," "a dull utilitarian, utterly insensible to all the beauties of nature," I freely accorded to him my mental forgiveness. It really is enough to irritate the bile of an enthusiastic arboriculturist to see the devastating decapitation of so many veteran friends, who have stood their ground (and exhausted it too) so long and so well; to see their defunct and mutilated members transferred to the tender mercies of saw, adzes, hammer, screw, plane, and nails—those waving domiciles of the merry morning songsters—those midnight recesses of the charming nightingale—that they should be bound in faggots and consigned by vulgar hands to the devouring and relentless flames—that cooling, shady, massive foliage, our protection from Sol's ardent rays—those fantastic but delightful collectors of winter's brilliant frosts and snowy flakes—those sturdy recipients of the ivy's fond embrace, agreeable even in their mossy decrepitude. It is enough to raise one's ire; I therefore do forgive the Reverend L. Vernon Harcourt the very unguarded ebullition of his indignation, and I will acknowledge myself a commonplace matter-of-fact utilitarian of the 19th century. But when I see my talented editorial friend of the *Gardeners' Chronicle* seriously deprecating the removal of timber trees from corn fields, adieu to joke or romance. Let me enter the list of facts, of calculation, of public utility, of public necessity, of science, and of profit. Am I dreaming? or is it a reality that our best and most luxuriant corn crops are to be found in our most treeless districts—our fens—our Lincolnshire wolds— our sloping coasts, where the excess of saline particles will not permit a tree to thrive? Does my friend Morton's model farm owe its long avenue of stacks to the presence of trees, or to their absence? Does my talented but thin-sowing friend, Hewitt Davis, grow his luxuriant crops under the protection of those giant robbers? Oh, no! nor does their absence ruin the open parish allotment, or the equally unsheltered market-garden. Is it their presence that has caused my friend Hutley to grow seven quarters of wheat per acre on twenty-acre fields? Decidedly not. When I see my lengthy wheats rolling and undulating like a distracted sea, I chuckle in self-content at the robbery of carbon they are committing on the truant wind. The upturned and ruffled leaves of my root crops are drinking deeply of the precious draught when old Boreas is most angry. In winter his welcome puffs find free access to air, and dry our lands. In summer the well-cropped ground is amply shaded by the growing crops of human food. In summer the greatest robbers of moisture and of food are those giant bundles of capillary tubes, called trees, whose roots I have frequently seen extending to the very centre of narrow fields. Will Dr. Lindley recommend so dangerous a protector to the flower-garden? Am I fanciful, or will not Liebig and Johnston, Dumas and Boussingault tell us that the food of the tree, organic and inorganic, is or ought to be the support of our own food? Mr. Harcourt's idea of growing trees for the sake of getting manure from their leaves!! is rich indeed. It is a practical illustration of laying out £5 to get back £1. However theoretical I may be called by farmers in some matters, in this I have their entire and hearty concurrence. As a matter of £ s. d., the loss by trees is enormous, both to landlord and tenant, as the annexed letter from my careful and practical friend, Foster, too truly illustrates. I submit it most deferentially, but confidently, to the test of arboricultural dissection, vouching for its accuracy as regards this county. At one of our Witham meetings Mr. Hutley said he would give 2s. more per acre for a farm free from timber; and at another, Mr. Joseph Foster stated as a fact, appealing to his neighbours for its confirmation, that an ash tree, value 6s., had damaged his heavy crop of carraway to the extent of 26s. No one who knows those gentlemen will doubt their accuracy. Well, then, are we to put on our manure to be consumed by timber trees? Is a famishing country to be fed with wood? Talk of spoiling the beauty of the country! What so grateful to the eye and to the mind as the contemplation of abundant food and ample employment for the people? I pity the taste that can prefer an oak tree to a cabbage, a nut grove to a field of wheat sheaves. Talk of destroying the beauty of the country! why I am often obliged (thanks to the timber mania) to drive for miles between two green walls, some ten feet high, with only an occasional glance through a gate-way or gap; the sky above

and the gravel road in front being one's only solace. If we do get into a three or four acre field, there is at all events no seeing one's way out of it. Those who advocate the present system may be literally and truly said to be taking a very limited view of the country. But stern necessity will soon compel us to give up our prejudices. The increasing millions must be fed, and in 50 years' time no man will be found bold enough to argue that we can grow timber and corn profitably in juxtaposition: the arboricultural enthusiast will then of necessity be located amidst the dark backwoods of America, where I sincerely wish him every joy. Mr. Hewitt Davis truly says ("Royal Agricultural Society's Journal," vol. 7, part 2, page 529):—"Were no other injury done to the crops by trees and hedges than that which arises from their mischievous shade and shelter, it would be equivalent to the ordinary rent of such fields; but the farmers sustain a further loss in the additional time occupied in its tillage by the more frequent stoppages and turns they cause, and by the encouragement to idleness in the men that their cover affords. I believe arable fields with large hedges and hedgerow timber round them, whose dimensions are under eight acres, are seldom or ever worth a farmer's cultivation. I see much poor open down land in profitable cultivation, and large districts of enclosed land of far better quality ruinous to the occupiers; and I have not a doubt that to the difference in the size of the fields this may be principally if not entirely traced."—*J. J. Mechi, Tiptree Hall, Kelvedon, Essex, Feb.* 1. "My calculations upon growing timber in hedgerows," says Mr. Foster, of Great Totham, "are as under:

1st. The average value of timber on 100 acres of land in the county	£100	0	0
2nd. Let it stand 28 years, and the improvement in value will not exceed 50s. per year	70	0	0
	170	0	0
3rd. Sell the same now	100	0	0
Interest and compound ditto..	300	0	0
4th. Tenant paying 2s. more per acre, with the interest and compouud ditto upon the same....	377	12	0
	777	12	0
	170	0	0
	£607	12	0

So that the proprietor of 1000 acres loses more than £6000 by letting it stand. Perhaps you will have the goodness to test this by your own figures, and give it publicity for the good of the community."—Gardeners' Chron.

ON FEEDING CATTLE WITH MALT.

Sir,—Your zealous and able advocacy of tenant-right and the repeal of the malt-tax encourages me to send you a few observations from a book on agricultural chemistry, by the Earl of Dundonald, published in 1795, "On feeding Cattle with Malt." He says, "The horses in Spain and Portugal are exclusively fed with barley, to which they give a preference. To shew that this taste is not peculiar to foreign horses, it is a well-known fact that when Burgoyne's regiment of Light Dragoons went to Portugal in the year 1761, the oats sent from England were carefully reserved for the opening of the campaign, and in the mean time the horses were supplied with barley, of which they became so fond, that when the campaign began they rejected the English oats, and were afterwards uniformly fed with barley." There is great reason to believe that the most judicious method of feeding horses or cattle with corn, is by giving them malted instead of raw grain. Malted corn tends to open the body and cleanse the intestines from all putrid, saline, biliary obstructions; which effects being attained, it no longer operates in this manner, at least in no degree inconsistent with the health of the animal. To such as do not regard a small expense in ascertaining so valuable a fact, it is earnestly recommended that a comparative trial be made in feeding two teams of horses with malted and unmalted grain, of the same sort and quality. Three months would fully ascertain this question, which, in the event proving, as it is here presumed it would, highly in favour of the malted food, there can be little doubt that, on proper representation of the beneficial effects of malted corn in feeding cattle, government would permit its use for this purpose, under certain restrictions and regulations.

By a supply, when necessary, of a small quantity of malt to year-old calves and young stock, they would, when green food is not to be procured, be kept upon the belly, and the *costiveness, binding of the hide*, and *biliary obstructions*, which at that season they are liable to, would by these means be prevented. It should be given properly mashed with hot water, when by the state of their fæces and hides they appear to require it: too little attention is paid by rearers and breeders of cattle to these necessary precautions.

The next application for which malt has been recommended is the clearing away *biliary obstructions*, and opening the bodies of oxen and other cattle, previously to supplying them with the food with which they are intended to be fattened, especially when such food is not sufficiently of an aperient nature.

And lastly, malted grain, when dry, but more particularly so when mashed, has been recommended to be given to milch cows, to make them yield a *greater*

quantity of milk, *richer* than that produced, and *free from the bad flavour* which milk is apt to acquire by feeding cows in the winter time on cabbages or turnips.

To meet the drawback on the revenue the author suggests a tax of one shilling a head on cattle; and as the flock-masters and large graziers are likely to be benefited by cheap grain (if the old adage hold good of "up horn, down corn"), they will be very able to stand it.

The breeders of sheep in Scotland are generally free from income tax, and it is well known that that part of farming has been by far the most profitable for many years, indeed ever since the free trade in wool took place. The tenant-right question I am much interested in. I have sunk many hundreds in permanent improvements, and I think it is but only justice to be allowed for unexhausted ones, in case of death or other casualties; and, as farmers are about to be brought into competition with all the world, the repeal of the malt-tax seems blended with tenant-right, and it behoves every son of the soil to do his utmost to shake off the trammel.

If you consider this or a part worthy of your columns you can use such as you like; if not, pardon me, and believe me to be—

A Well-wisher to the Community.

North of the River Sark, Feb. 24, 1848.

A UNIFORM SYSTEM OF DRAINAGE.

"Science begins at the point where mind dominates matter—where the attempt is made to subject the mass of experience to the scrutiny of reason. Science is mind brought into connexion with Nature."—"*Cosmos*," *by Baron Alexander Von Humboldt.*

Cheswick House, Berwick-on-Tweed, March 7th, 1848.

Sir,—At a time when so much attention is directed to the improvement of land by draining, and when so large a sum has been so liberally devoted by Parliament to this the most necessary and important department of rural economy, it is very much to be wished that all doubts as to the most efficacious mode of drainage should be dissipated, and the question as to the depths and distances apart of drains set at rest. My experience has confirmed the opinion long entertained, that a uniform system of drainage, without so much regard to the nature of soils and subsoils as is generally thought necessary, might be beneficially adopted. The minimum depth of furrow drains should be 3 feet, and the distance apart on an average 20 feet—varying from 15 to 30 feet. With furrow drains of 4 feet the distance apart should be from 33 to 40 feet. The main drains and outlets of corresponding depth. Drains constructed in this manner, and tiles or pipes varying in size and diameter from 1½ inch to 3 inches for the furrow drains, and from 3 inches to 6 inches diameter for the main drains, properly and carefully set therein, will be found capable of effecting the most complete and effectual drainage of any description of land. The more water naturally yielded by the land to be drained, the greater the number of roods of drain per acre, and the larger the tiles or pipes should be; and the deeper the drains are, the more quickly and effectually will the water be discharged from the land. A very ingeniously contrived instrument for measuring the quantity of water delivered by a drain in a given time has been invented by David Milne, Esq., of Milne Garden, in Berwickshire. This gentleman has drained several farms in Berwickshire, and is at present carrying on very extensive works of drainage under the superintendence of the Drainage Commissioners in that county. The instrument in question, which may be called a "drain water meter," will enable the drainer to ascertain the quantity of water discharged from a portion of land in a given time — say a day, a week, or a month—by placing it at the mouth or outlet of the main drain into which all the other drains in the field or portions of land deliver their water. Thus, if it were desired to ascertain which mode of drainage is most effectual, in quickly and completely drying the land, a field or portion of land might be divided into three or more portions, and different modes of drainage adopted upon each, as to depth of drains, distances apart, and size of tile or pipe; each portion having a distinct and separate outlet, where one of Mr. Milne's instruments might be placed. This is so contrived as to register by an index the number of gallons of water discharged from the drain in an hour, a day, a month, and indeed for the entire year. That mode of drainage which will discharge the largest quantity of water from the land in the shortest time, must be considered the best; and I feel confident that deep drains will effect this most desirable result sooner than shallow ones, let the soil and subsoil of the lands drained be of any kind and description whatsoever.

I am, Mr. Editor, your obedient servant,

John S. Donaldson Selby.

Assistant Drainage Commissioner.

P.S.—To all persons engaged in draining land I would recommend the perusal of the evidence taken before a Committee of the House of Lords in 1846, copious extracts from which will be found, together with an introduction upon drainage, and a copy of the Drainage Act, in a little work by Henry R. Dearseby, Esq., Barrister at Law, and published by Thomas Blinkarn, Bookseller, 19, Chancery Lane, London. Also a Manual of Practical Draining, by Henry Stephens, Esq. In these works the drainer will find many old and obsolete prejudices and practices successfully combated and exposed, and the improved theory and practice of modern draining clearly and intelligibly pointed out.

NORTHAMPTON MEETING.—A handsome service of plate, and a public dinner, were given last week to Thomas Sharp, Esq., the late mayor of Northampton, in testimony of the valuable services that gentleman had rendered to the town, as its chief magistrate, during the period of the country meeting of the Royal Agricultural Society of England for 1847, held, by invitation, within the precincts of that borough in July last, in his having so successfully united all parties without any reference whatever to their political feeling, to co-operate with himself in promoting the honour of the town, and the national objects of the Society, on that memorable occasion.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Weekly Council was held on Wednesday, the 23rd of February. Present—Mr. Raymond Barker, in the Chair; Mr. Almack; Mr. Bosanquet; Mr. Bramston, M.P., Dr. Calvert; Rev. Thomas Cator; Mr. Fuller, M.P.; Mr. Brandreth Gibbs; Mr. Fisher Hobbs; Rev. C. E. Keene; Mr. Langston, M.P.; Mr. Miles, M.P.; Mr. C. Miles; Prof. Sewell; Mr. H. Smith; Mr. Reynolds Solly; Mr. Thomas Turner; and Mr. Tweed.

Gypsum.—Prizes for Cattle and Sheep.—Communications were received from Mr. Wilson, Principal of the Royal Agricultural College at Cirencester, on the Canadian Gypsum, sent by the Council for trial at the experimental farm of that establishment; and from Mr. Turnor, of Abbot's-Bromley, Staffordshire, on prizes for long-horned cattle (as a breed peculiarly suited to the cold clayey pastures and high elevations of that county), as well as for other breeds of cattle (as the Sussex, the Galloway, and the Ayrshire), and for particular breeds of sheep (as the Cheviot, the Ross or Old Ryeland, the clan-Teviot, the black-face Cannock, and the Shropshire—the former, he thought, yielding probably the finest wool and mutton in the kingdom), adapted to extensive localities and to different climates and soils, and of which he conceived the improvement to be an object of national importance.

Wheat and Potatoes.—The Chairman favoured the Council with the following report of his cultivation of the wheat and potatoes distributed for trial among the Members present at one of the Meetings of the Council during their former session: namely—"*Wheat:* Samples of the wheat from Australia, sown March 16, and came into ear June 5, 1847. *Potatoes:* Specimens planted March 16, 1847. The Jamaica potatoes white; the other two samples purple and red; no growth of either haulm or tuber till after the rain early in August, the tuber being at that time not bigger than a marble. After rain, the haulm grew to the length of 4 ft. 9 in., when the tubers also began to grow. The crop was dug up late in November, but was then not ripe throughout. A considerable number (chiefly of the purple variety) were diseased. The produce obtained was about half a bushel, from about half a gallon of seed plants. These potatoes were planted in a garden where no potatoes had ever been grown. From one of Lance's smallest seedlings eleven tubers of various sizes had been obtained. The latter were sown March 6 in a common hot-bed. From the portion supplied of Lance's Potato Seeds mixed with wood-ashes, sown in a garden-pot March 16, and grown in the same hot-bed, 8 plants grew to a size fit for planting out; the two weakest plants left in the pot produced 22 tubers; pot No. 2 had 12; No. 6 had 17; No. 5 had 23; No. 8 had 9; No. 3 had 27: all of various sizes.—Hambleden, Bucks. T. Raymond Barker."

An interesting discussion then ensued, in the course of which Mr. Miles, M.P., stated that he had, for the last twelve years, cultivated the Belle-vue Talavera Wheat, on inferior land in Somersetshire, with so much success, that he had found it the best spring wheat he had met with; and so superior in his experience to every other variety, that he had never once changed it.—The Chairman remarked, that in the midland portion of England the Hopetoun was a favourite variety; and Dr. Calvert observed that for the hills of Yorkshire, the Adelaide variety was employed with great advantage, but required a peculiar mode of cultivation.—The Chairman stated that his land in Buckinghamshire, on which the trials of wheat and potatoes had been made, was of a mouldy, dirty kind; and he had found the Canadian Gypsum have a great effect in promoting the growth of potatoes under such circumstances.

Phosphate of Lime.—Mr. Miles, M.P., suggested that the Consulting-chemist of the Society should be directed to report to the Council the proportion of Phosphate of Lime contained in the original native specimen of Phosphorite from Estremadura, presented to the Council by Mr. Kimberley, when that gentleman had in the first instance called the attention of the Society to the value of the important mineral substance in question; and the proportion also of that salt as contained in the organic remains occurring in Mr. Paine's land, and referred to by Prof. Way at the last Weekly Meeting of the Council. Mr. Miles thought it would also be interesting to the Members to have specimens of those organic remains placed on the table for their inspection.

The New York State Agricultural Society transmitted seven volumes of their Transactions, along with a copy of their Diploma, and an impression of their Medal. Mr. B. P. Johnson, their Secretary, at the same time favoured the Society with a copy of his Report of the Proceedings at the Annual Fair at Windham Centre.

The Council then adjourned to Wednesday.

A Monthly Council was held at the Society's house in Hanover Square, on Wednesday, the 1st of March. The following Members of Council and Governors were present: Mr. Raymond Barker, in the chair; Lord Southampton; Sir Robert Price, Bart., M.P.; Mr. Bennett; Mr. Bramston, M.P.; Mr. Brandreth; Mr. Burke; Col. Challoner; Mr. Bell Crompton; Mr. Evelyn Denison, M.P.; Mr. Druce; Mr. Garrett; Mr. Brandreth Gibbs; Mr. Grantham; Mr. Hillyard; Mr. Fisher Hobbs; Mr. Holland; Mr. Hudson, of Castleacre; Rev. C. E. Keene; Mr. Kinder; Mr. Miles, M.P.; Mr. Milward; Professor Sewell; Mr. Shaw, of London; Mr. Shelley; Mr. Slaney, M.P.; Mr. Smith, of Burley; Mr. Stokes; Mr. Thomas Turner; and Professor Way.

Finances.—The Chairman laid before the Council the report of the Finance Committee on the accounts of the Society, from which it appeared that, on the last day of the month of February just ended, the invested capital of the Society stood at £8,999 stock, with a current cash balance in the hands of the bankers of £2,629. The Chairman explained that this general balance was made up of the following special balances—namely, York Subscription Balance, £980; Arrear Balance, £742; Composition Balance, £401; and available Balance for current purposes, £506—and submitted to the Council the recommendation of the Committee that the £742 then reported as the amount received on account of subscriptions in arrear be invested in the purchase of stock, and be thus added to the fund of invested capital standing in the names of the Trustees of the Society. This report, with the recommendation it contained, was unanimously adopted by the Council.

The Chairman also reported to the Council the recommendations of the House Committee, in reference to the periodical repairs required in the Society's House by the terms of the lease, the custody of the great seal and legal documents, and the means proposed for keeping up the arrangement of the library and the catalogues of the books; all which recommendations were adopted by the Council.

Trial of Implements.—Colonel Challoner, Chairman of the Trial of Implement Committee, presented the following

REPORT

OF THE COMMITTEE ON CONDITIONS FOR THE TRIAL OF IMPLEMENTS.

The Committee, having had under their consideration the report of the Consulting-Engineer of the Society on that part of their former report which the Council, in December last, directed the Committee to reconsider, find that the schedule of conditions which that portion comprised, for the trial of winch or crank implements and machinery driven by steam or horse power, has, with the suggestion of a few verbal alterations, received the approbation of the Consulting-Engineer of the Society; and the Committee have accordingly resolved to recommend to the Council the adoption of the following conditions (to be inserted in the Implement Prize-Sheet, between the Regulations at present standing as Nos. 18 and 19), wherein the verbal amendments suggested have been made, namely:—

"1. That all implements turned by the winch or hand-crank, shall not be worked at any trial beyond the revolutions following:—

40 revolutions for 12-inch crank.
35 „ 14-inch „
30 „ 16-inch „

"2. That in machinery driven by horse-power, the utmost speed that the horses shall be driven at during any trial shall not exceed 2¼ miles per hour, or 198 feet per minute.

"3. That steam-machinery shall, under no circumstances, be allowed to compete at any trial with a greater pressure than 45 lbs. per square inch in the boiler: at which pressure, it will be expected that the engine shall work up to the power declared by the exhibitor.

"4. That a note be added (in italics) that the quantity of fuel consumed by each engine will be strictly ascertained by the judges."

The Committee have also had under their consideration the question of regulations for the trial of implements at the country meetings of the Society, and of the best system of distributing the duties of the Judges.

The Committee beg to submit to the Council the adoption of the following recommendations, which can be amended as experience may suggest:

I. That in the trial of Steam Engines, an apparatus known as a "Force-Resister" be purchased by the Society, and be employed by the Judges as a test of power: such apparatus consisting of a friction break, acted upon by a rotatory pendulum, to supply and to regulate the friction, as well as to show the utmost resistance for any quantity of power that the engine on trial may require.

II. That the Judges be directed to ascertain in every engine, and report in their award whether regulators or governors are used in the steam engines which they recommend for prizes, and also to ascertain the temperature of the water in the boilers immediately prior to the lighting of the fires at the commencement of the trial of the steam engines.

III. (1.) That the exhibitor of each steam-engine shall furnish to the Society at the time of entry a longitudinal and transverse section plan of the boiler, showing the action of the fire upon the flues; and also state, in writing, the thickness and quality of the boiler plates, as well as the diameter of the cylinder, the length of stroke of the piston, the number of revolutions of the crank shaft (with its diameter, and whether made of cast or wrought iron), the diameter and weight of the fly-wheel, the diameter of the driving-wheel or pulley, the number of horse-power that the engine is calculated to work at, the probable time it will require to generate the steam (taking water at 60 degrees), to steam at the working pressure, and the quantity of fuel it will consume in getting up the steam, and the consumption of fuel for every hour it is in full work. (2.) That the exhibitor of each threshing machine be required to state, in writing, at the time of entry—1st, *If driven by steam power*, the diameter and length of the drum, the number of revolutions it makes per minute, the diameter of the wheel or pulley on the drum spindle, and whether driven by a strap or wheel: 2nd, *If driven by horse-power*, the number of horses he will require, and the number of revolutions they will make per minute, the diameter and length of the drum, and the number of revolutions it makes per minute: (3.) That the exhibitor of each corn mill, corn and linseed bruiser, chaff-cutter, or of any other rotatory machine required to be driven by power, be required to state, in writing, at the time of entry, the number of revolutions per minute they are to be driven (nor exceeding the limited speed set forth in the foregoing conditions), the number of horse-power required to drive them, and whether driven by a strap or wheel; if by a strap, to state the diameter and width of the driving pulleys, also the diameter and weight of the fly-wheel (if any).

IV. The Committee recommend for the year 1848,

that, in addition to the Consulting-Engineer of the Society, who acts as mechanical referee, there should be ten Judges of Implements; two of these to be engineers, and the remaining eight to be practical farmers. 1. That the two engineers should be the sole judges of steam engines and of steam power generally, considered in a scientific and mechanical point of view, without reference to the application of such power to agricultural machinery; but that they should report to the stewards in writing, for the information of the other judges, a statement of the power applied to the machinery under the consideration of any of such judges. 2. That the other judges should judge the work done by any agricultural machine to which steam or other power is applied; but that it be an instruction to them to pay every attention to the report of the engineers in forming their judgment of the work of the machinery on which they are called upon to adjudicate.

V. That in the trial of machines, in every case where practicable, steam power should be adopted instead of horses, as the most accurate test of the relative working of machinery.

(Signed) C. B. Challoner, Chairman.

This report having been unanimously adopted by the Council, Mr. Fisher Hobbs expressed his strong approval of the Force-resister recommended by the Committee to be purchased by the Society, but thought it desirable that, although inquiries should be made in reference to the cost of such an apparatus, and requisite economy taken into consideration in its purchase, still, that as the proposed test of trial was admitted to be of so decisive a character, he trusted that only an efficient apparatus, even if the cost was a little greater in the first instance, would be procured for the Society, for the purpose of effecting the important object in view in reference to trials of machinery at the country meetings of the Society; when the two following points of inquiry, suggested respectively by Colonel Challoner and Mr. Shelley, were referred to the Committee:—

1. To take such steps for obtaining a Force-resister as in the opinion of the Committee would meet the exigency of the case.
2. That the Committee be requested to take into consideration the drawing up of the report, for the Journal, on the exhibition and trial of Implements at the ensuing York Meeting, and to report to the Council their recommendation on that subject.

Colonel Challoner then reported from the Committee the suggestions of Mr. Brandreth Gibbs, in reference to the disqualification of all entries made for implements by the 1st of May, of which the final details (required by the 2nd regulation of the Implement Prize-sheet) should fail to be sent on or before the 1st of June; and also in reference to a statement to be made by exhibitors, not only of the space required by them for exhibition, but likewise of the total number of articles of exhibition intended to be sent by them to the show; both of which suggestions, agreeably with the recommendation of the Committee, were adopted by the Council.

York Meeting.—Mr. Shelley, as the Chairman of the Meeting of the General York Committee held that day, laid before the Council the following recommendations, namely—

1. That the Secretary of the Society be directed to make application to each of the parties who entered stock or implements for the Northampton meeting, but omitted to send the same for exhibition, informing them of the amount of the fines incurred in each case, and requesting a remittance of their respective amounts.
2. That the conditions and regulations of the Prize-sheets for the York meeting, as finally arranged by the Committee, be approved for publication.
3. That the Plan of the Show-yard, as drawn out by Mr. Brandreth Gibbs, and approved by the Committee, be adopted for the York Meeting.
4. That the Secretary be instructed to communicate with the Railway Companies on the subject of the conveyance of stock and implements to and from the ensuing Country Meeting of the Society.

These recommendations were unanimously adopted by the Council.

Steward.—On the motion of Colonel Challoner, seconded by Mr. Shelley, Mr. Hudson, of Castleacre, was unanimously appointed one of the Stewards of the Cattle-Yard for the Country Meetings of the Society.

Discussions.—Mr. Slaney, M.P., brought forward his motion, on the advantages which in his opinion would result from a practical discussion, after the ordinary business of the Council, on topics of interest to those members of the Society who might from time to time be in town during the session, and enabled to attend its weekly meetings. He mentioned, as instances of such topics, of wide interest, and connected with innumerable details: 1. The price of Draining Tiles; 2. The management of Fences; 3. The making and keeping in order of Farm Roads; 4. The Insurance of Ricks and Farm Stock; 5. The conveyance, by means of pipes and hose, of Town Sewerage, for agricultural purposes. He conceived that discussions on such topics, and on others of a similarly practical character as would arise in constant succession, if confined to questions not under the consideration, or about to be brought under the notice of parliament, and carried on, not as public addresses, but in familiar and quiet conversations, would excite great interest, and lead to much information connected with the progress of agricultural processes and experiments; but although this, in his opinion, was an arrangement which would lead to interesting communications of facts, he would by no means wish to press his motion, unless it met with the entire approbation of the Council.—Mr. Hillyard would second the motion, provided the discussions were carried on only once during the month.—Mr. Denison, M.P., thought that the plan would not be found to answer the expectations of Mr. Slaney, consistently with the transaction of the ordinary business of the Council, and the engagement of the time of its members elsewhere at the close of their present meetings.—Mr. Slaney then expressed his readiness to accede to the suggestion of Mr. Denison, on whose opinion he placed a high value; but trusted that at some future time

the plan he proposed might be adopted in some way which would be considered by the Council as free from objection.

Member of Council.—Mr. Fisher Hobbs having withdrawn the name of Mr. Jonas Webb, and Mr. Burke that of Mr. Tweed, as candidates respectively proposed by them to fill the vacancy occasioned in the Council by the decease of Mr. W. R. Browne, on the motion of Mr. Bennett, seconded by Mr. Shelley, Mr. Hudson, M.P., was unanimously elected to fill that vacancy.

Farming Accounts.—The Farming Account Committee had leave granted for an extension of time for making their report to the Council.

Draining Level.—Mr. Chadwick had leave given him to explain to the Council the construction and advantages of Blundell's Drainage Land (in which the change of horizontality in the instrument is indicated by the change of level in two surfaces of a connected body of liquid ; the surface for registry rising and falling in a glass tube, which remains nearly vertical, and to which a scale for reading off its variations is attached), for which attention the Council gave to him their thanks, with an express understanding, however, that they gave no opinion on the invention then submitted to their inspection.—Mr. Shelley suggested that the level in question might be shown, like any other instrument of an agricultural character, at the Country Meetings of the Society, if duly entered for such exhibition.—Mr. Hobbs thought that a cheap and efficient drainage level would be of great service to farm-bailiffs.

Phosphate of Lime.—Professor Way, the consulting Chemist to the Society, presented, in the name of Mr. Paine, of Farnham, specimens of the fossils, containing phosphate of lime, from the upper and lower green sand ; together with samples, in their natural state, of the soils in which these valuable fossils are found. Professor Way called the attention of the members to the phosphatic fossils from the gault clay, which in an interesting manner connects the upper with the lower beds of these remains, and leaves no doubt in his mind that the conditions which prevailed during the collection of this large phosphoric deposit must have extended over a lengthened geological epoch. He entertained no doubt that the deposits might be profitably worked at the *outcrosses ;* but whether the great bulk of the phosphate of lime would be available for agricultural purposes could only be ascertained by experience. As there were obstacles to the working of the bed in some places, so no doubt there would be great facilities in others. Agreeably with the request of the Council at their previous meeting, he had analyzed the phosphorite mineral from Estremadura, originally presented to the Society by Mr. Kimberley ; and it was found to contain about 41½ per cent. of phosphoric acid, which would form nearly 86 per cent. of phosphate of lime, or bone-earth. Professor Way, however, explained that phosphoric acid, as existing in phosphate of lime, did not represent the precise chemical condition under which that acid existed in the phosphorite ; but that the proportion of it given might in all respects be taken as an index of the agricultural value of the mineral in which it occurred. In comparison with the Estremadura specimen, he stated that the fossils of the upper green sand were found to contain about 57 per cent. and those of the lower green sand 43 per cent. of phosphate of lime ; and he trusted that the great abundance of these fossils, and the facilities for collecting them, would render them far more important to the English agriculturist than the phosphorite mineral itself, even should means be found for the more ready importation of that foreign substance. Mr. Paine, in conjunction with Professor Way, intended to draw up and offer to the Journal Committee a complete statement on this subject.—On the motion of Mr. Fisher Hobbs, the thanks of the Council were voted to Professor Way and to Mr. Paine, with a reference to the Journal Committee of the offer to which Professor Way referred, of a detailed communication on this interesting subject for the pages of the Society's Journal.

Manures.—Mr. J. R. Johnson, of 41, Nelson-square, Surrey, communicated to the Council an offer to submit a sufficient quantity of his ammoniacal phosphate manure for trial upon ten acres of land by Members of the Council ; and Mr. Richard Dover, of 28, New-street, Spring-gardens, offered to supply a sufficient amount of his British guano for the same extent of ground, and to be tried under the same authority. Mr. Purser, of New Bridge-street, also called the attention of the Council to the value of his fishery salt as a manure for land. The Council decided (on the motion of Mr. Stokes, seconded by Mr. Shelley) that they would not in future accept any offers of manures sent for trial by the Council. Mr. Hobbs stated that he was acquainted with the fishery salt, of which a sample was then laid before the Council by Mr. Purser ; in fact, he had already purchased 1,000 tons of it for his own use instead of common salt, and at a much lower price. It contained from 10 to 15 per cent. of oil ; being nothing more than common salt which had been employed on the coast of Cornwall for curing pilchards. He would, at a future time, report to the Council the results of his trial with it in comparison with the effects of common salt.

Pleuro-Pneumonia.—Mr. Palin, of Stapleford Hall, Cheshire, expressed a hope that the essays competing for the Society's prize on the subject of pleuro-pneumonia among cattle, and which were to be sent in by that day, might contain some valuable information on that subject for the benefit of the agricultural community at large ; and he trusted that, should such be the case, no time would be lost by the Journal Committee in placing the information before the members. He had himself suffered severe loss from the ravages of the disorder amongst his stock ; and it was at that time making fearful inroads into the dairy stocks of that county, many farmers having lost more than two-thirds of the number of their milking cows by the disease, and in some instances the yearling calves had died of the same affection. Mr. Palin had had thirty-five cases amongst his cows, and two amongst his yearling calves ; and of which number of animals only nine were now left alive, and these he considers were saved by early and copious bleeding and gentle laxative internal medicines ; but even these,

thus saved, were, he stated, worthless to him as dairy cows, the disease having in every other instance caused abortion, and the cattle were very much emaciated. How far the disease was infectious he was not prepared to say. The first of his cases occurred in July; and it was nine weeks afterwards before he had any further outbreak of the disorder. It then re-commenced, and his stock had not been free from it since that time for more than a fortnight together. During the previous week he had three severe cases, two of which had proved fatal, and the recovery of the third animal remained very doubtful.—Mr. John Lees Brown, of Farewell, near Lichfield, also addressed the Council on the same subject. He had had most serious losses in his stock from the pleuro-pneumonia, nearly the whole of his stock having been swept off by its ravages.—Mr. Bennett stated that his Irish stock (tied up in a separate yard) had been perfectly free from disease; while several of his English cattle (also tied up in other yards) had been taken, and died. His best young animals had been affected and carried off. He had adopted the system of bleeding, and placing a seton in the dewlap, and had not had any of his stock affected since.—Mr. Hillyard stated that his Irish cattle had at first suffered, but he had now 30 sound.—Mr. Smith (of Burley) had witnessed many cases of the disease, which he did not believe to be infectious. On its first appearance he had experienced great loss, and had consulted many local veterinary practitioners in vain. He at length, however, was fortunate enough to meet with a retired practitioner, who cured the whole of his stock affected with the disease by the administration of a particular drink which he gave them. The same drink had in every subsequent case effected a perfect cure. His Irish cattle had suffered more than his English ones. He had lost 52 head of stock in a single year in consequence of the disease in question. In every case, as well as in his own, he found the drink to which he alluded equally successful in removing the disease. The retired practitioner whom he had employed only administered the drink: he did not bleed the animals.—Mr. Brandreth, on his estate in Bedfordshire, had had some of his Welsh bullocks slightly attacked with the prevailing complaint: some in the same house were attacked, while the remainder escaped. He had bled them and given them drinks.—Mr. Hobbs believed that the disease was raging much as usual: the cattle of the country were decimated by its fatal effects. Farmers who formerly had kept from 30 to 40 animals, now kept not one.—Mr. Shelley feared that its results were felt not only by the farmer but also by the consumer.—Mr. T. Turner considered the complaint to be nothing more than a *fever*, and conceived that it ought accordingly to be treated as a febrile affection. The circulation, as usual under such circumstances, was disturbed; and he would strongly recommend that the early symptoms be narrowly watched, and when they first indicated the disorder, prompt depletion would at once cut short the malady. The state of the bowels would, of course, be attended to; and a seton, or rowel, would be advisable. He considered that scientific men were not generally called in soon enough.—Mr. Bennett had seen much of calling in practitioners in the cases of this disease in all its stages; and he had found very little benefit result from their attendance.—Mr. Hobbs thought this disease to be so severe a scourge throughout the country, that the award of the Society's gold medal to the fortunate discoverer of a certain plan of cure would not be too high an acknowledgment on the part of the council.—Mr. Smith, at the request of the Council, undertook to communicate with the retired practitioner to whom he had alluded, and to report the result to the Council.—Professor Sewell would suggest that the most attentive observations should frequently be made of the stock, either by the owner or his attendants (whether herdsmen or shepherds); and on the appearance of any deviation from their healthy condition or usual habits, that a considerable quantity of blood (about a gallon in full-sized good-conditioned cattle, and a pint from sheep) should be taken from the animals at once; and then to call in a regular practitioner to prescribe or administer the most proper remedies. He considered that the most experienced practitioners concurred in the depleting system; and that its failure arose from the neglect which allows the inflammation to terminate in effusion into the substance of the lungs, and thus obliterate the air-cells; or into the cavity of the chest; or both. In the first case, destruction is speedy; but in the second, when confined to the chest, the animal may linger on for several weeks. He would recommend that the external applications should be powerful stimulants or blisters to the sides of the chest; or setons in the dewlap and chest; or hellebore issues (commonly known by the term "pegging"). He thought that if the owner of stock, or some person in his employ, were instructed how to bleed an animal, many very valuable head of stock would be saved by such immediate reference to the lancet, as the intermission of a few hours only renders such depletion unavailing. Bleeding he regarded as the sheet-anchor in all inflammatory diseases. A whole flock of sheep, attacked with acute inflammation (reduced in number by some which had previously died), were saved by the prompt measure of bleeding each of them. They were all in good condition, and the weather at the time was warm. This would not, however, be proper practice in those cases which have recently occurred as the results of a cold and wet season. The disease is affecting the viscera of the abdomen as well as the chest, and the animal gradually wastes and dies exhausted, in consequence of the ensuing dropsy and diarrhœa. In some cases death has been supposed to ensue from a considerable number of worms found in the air-passages. He recommended that animals which appear to be failing in health should be removed to shelter and confined to dry food. The worms, he remarked, that are often found in the trachea and bronchial tubes of debilitated and old horses, cattle, and sheep, seldom cause death; but that fat calves more commonly suffer from these parasites, as horses do from worms in the stomach and intestines.

Specimens of Wheat.—On the motion of Mr. Shelley, seconded by Professor Sewell, the best thanks of the

Council were voted to the Rev. Professor Henslow, for the communications he had made to Mr. Pusey, M.P., and the specimens of wheat he had forwarded to the Society, in explanation and completion of the arduous and important task he had undertaken, of arranging and illustrating the interesting collection of Wheats, for which the Members are indebted to Professor Henslow's kindness, and to the devotion of a great amount of his valuable time and labour.

Thibet Barley.—Sir William Hooker presented to the Society a portion of Thibet Barley (Hordeum cæleste), from a supply forwarded to him by the Agro-Horticultural Society of Bombay. He had reserved a portion for the Kew Gardens, and had sent the remainder to the Council, thinking it probable that some of the Members might wish to make trial of its cultivation. The Council ordered their best thanks to Sir William Hooker for this mark of his attention to the objects of the Society; and Mr. Raymond Barker and Professor Sewell undertook to try and report upon the qualities of this barley.

Judges.—Mr. Milward gave notice that at the next Monthly Council he should move that in the resolution of the 9th of December last the following substitution be made, namely, instead of the passage (as it now stands)—"for whatever classes he may be proposed to be appointed," to substitute the following, namely—"for the class for which he recommends him."

The Yorkshire Agricultural Society transmitted to the Council a copy of their Transactions, just published. The Baron Hertefeld, of Liebensberg, near Berlin, in transmitting his life composition as a member of the Society, expressed the satisfaction it would give him to promote any of the objects of the Society, or to show any attention to the individual wishes of its members, in that part of the continent where he resides. Mr. Fisher Hobbs obtained leave for Mr. Love to make trial of the American plough in possession of the Society, and to report the result to the Council.

The Council then adjourned over Ash Wednesday to the 15th inst.

A Weekly Council was held at the Society's House in Hanover-square on Wednesday, the 15th March: present; Sir John V. B. Johnstone, Bart., M.P., in the chair; Mr. Almack, Mr. Bosanquet, Dr. Calvert, Mr. B. E. Hall, Mr. Fisher Hobbs, Mr. Wren Hoskyns, Mr. Kinder, Mr. Majendie, Mr. Miles, M.P., Mr. Nesbit, Professor Sewell, Professor Simonds, Mr. Stansfield, M.P., Mr. Trench, Mr. H Tull, and Mr. Tweed.

Wheat.—The Chairman called the attention of the Council to a variety of bearded Wheat which, for the last three or four years, had been cultivated in Yorkshire, and found exceedingly well adapted to the moorland districts of that county. Although sown so late as the 28th of April, the resulting crop was found to be quite equal, both in amount and quality, to those of the ordinary creeping Wheat sown in November. This Wheat was one of the red varieties, and originally obtained from Wiltshire. An extensive trial was in progress this season throughout Yorkshire on its cultivation, the result of which he would communicate to the Council. The Wheat in question was not thick-skinned, and it yielded a flour for which the millers gave the same price as for that obtained from the autumn-sown varieties. It was well adapted to their light burning soils, as furnishing a convenient substitute for Barley. —An interesting discussion then ensued, in which Mr. Fisher Hobbs and Mr. Tweed favoured the Council with the result of their practical experience on the comparative values of different varieties of Wheat for the miller. —The Chairman also took that opportunity of calling the attention of the Members to some valuable deductions drawn by Mr. Thompson from a series of experiments made on the Hackness estate, for the purpose primarily of testing the value of Liebig's patent manure for the Wheat crop in comparison with guano and farm-yard manure. The statement of these experiments, and Mr. Thompson's appendix to it, would be found in the Part of the Transactions of the Yorkshire Society (No. 10, page 72), just published, and a copy of which was then lying on the table. The points to which these deductions had reference, were:—1. The effects of Liebig's manure; 2. The time for using guano; and 3. The comparative value of ammoniacal and mineral manures: and the results were, the failure of Liebig's manure for the Wheat crop under circumstances where nitrogenous matter was accidentally absent; the decided advantage of using guano on heavy soils in the autumn at the time of preparation for sowing (when the Wheat is not sown earlier than November); and the strong corroboration afforded to the views of Mr. Lawes in the last Part of the Journal of the Royal Agricultural Society of England—"That nitrogenous manures" (to use Mr. Thompson's own words) "are of the first importance, as far as the Wheat crop is concerned; and that if these are deficient, mineral manures cannot, by any means, supply their place." Mr. Thompson considers that in the case of lighter soils, the time for employing the guano would be more dependent on the discretion of the cultivator, but that its early use in the spring, under such circumstances of soil, would be attended with great advantage.

Potatoes.—Mr. Miles, M.P., favoured the Council with a supply of seeds of the potato plant, selected from the mountains of Chili, and imported direct to this country, and in fine condition, from that region of the Southern Hemisphere, by Mr. Bright of the firm of Messrs. Gibbs, Bright, and Co., merchants. At the suggestion of Mr. Miles, these seeds were distributed among the members then present, with a request that they would furnish the Council on a future occasion with the result of their respective trials.

Italian Rye-Grass.—Mr. Rodwell, of Alderton Hall, transmitted to the Council specimens of the pale and brown varieties of Italian rye-grass grown with barley on his estate in Suffolk. They were sown in April, 1847, and gathered on the 29th of February, 1848; and Mr. Rodwell remarked that on comparing with each other the specimens then submitted to the Council, it would again be found that the superior growth of the brown variety fully bore out the opinion formerly given of its value in the Journal of the Society, vol. v., p. 284.

Fossil Phosphate of Lime.—Mr. Nesbit detailed to

the Council the researches in which he had been engaged since November last, for the discovery of sources of phosphoric acid in different soils; and, on the motion of Mr. Fisher Hobbs, the Council voted him their thanks for this statement, with a request that he would communicate it in writing to Mr. Pusey, M.P., the Chairman of the Journal Committee. The Chairman thought it possible that the existence of this acid would be ascertained in many of the mineral groups in different parts of the kingdom, and especially in the Yorkshire hills, in the west of England, where there ran a district along the foot of the Wolds remarkable for its fertility.

Bones.—Mr. Miles, M.P., remarked that he had found, in repeating the important process of disintegrating bones for manure without the use of acid, as described by Mr. Pusey in the last part of the Society's Journal, that instead of sand, ashes, or earth, it was a great improvement to use sawdust as the material for covering up the heaps; double the amount of heat being evolved, and the disintegration being effected much more rapidly and effectually. He piled up the bones into a heap, which he moistened well with water, and then covered over to the depth of two or three inches with sawdust—a process by which not only the bones themselves were rapidly converted into manure, but the sawdust itself also. This plan, he observed, only differed from that of Mr. Pusey in adopting, instead of earth or other mineral substance, the use of sawdust as a vegetable substance, generally at hand on all farms in great abundance. Mr. Nesbit remarked that he feared that by this process of decomposition much ammonia in a volatile state would be developed and escape; but the Chairman conceived that, even should such be the case, and the chemical action be different in this process from what it is in dissolving bones by means of sulphuric acid, still, in reference to the growth of turnips, it had been shown by the experiments of Mr. Way and Mr. Lawes, that such loss of ammonia would not be of much consequence, as it is the phosphoric acid chiefly (however obtained, and under whatever condition presented), and not so much the volatile alkali, that the turnip seeks for its food and the source of its nourishment and increase. It was also remarked that Mr. Hudson, of Castleacre, in Norfolk, and also an extensive farmer in Oxfordshire, had found by practical trial the most decided advantage in this mode of preparing bones as recommended by Mr. Pusey.

Pleuro-pneumonia.—Mr. Evan Davies, of Patton, in Shropshire, transmitted to the Council a statement of the successful administration of a remedy for the prevalent disorder amongst stock, along with a copy of the report made by the Wenlock Farmers' Club on the subject. Thanks were ordered to Mr. Davies for these communications, which were referred to Prof. Sewell for the favour of his examination, and report to the Council in reference to the remedy proposed.

Australian Barley. — Mr. Baker, of Cottesmore, transmitted his report on the Australian Barley sent to him for trial, for which thanks were ordered on its being referred to the Journal Committee.

Library.—Mr. Turner presented a copy of the Lecture on Manures delivered by Mr. A. Gyde before the North Staffordshire Agricultural Society; Mr. Chandos Wren Hoskyns, a copy of the Report of the Society for Promoting the Amendment of the Law, on the Law of Landlord and Tenant; Mr. Fisher Hobbs, a copy of Mr. Corbet's Prize Essay on Tenant Right; Mr. Spence, President of the Entomological Society, a copy of his Anniversary Address; Mr. Patterson, Vice-President of that Society, a copy of his paper on the Study of Natural History as a Branch of General Education; Mr. George Ransome, a statement of the advantages of the Ipswich Museum of Natural History for the working classes; Mr. Trench, a copy of a work by his relative the Hon. Charles Trench, containing designs of houses for labourers and farmers in Ireland, with estimates and explanatory details; Mr. Thom, a copy of his work on the Statistics of Ireland; and from Mr. Brabazon, a copy of his work on the Deep Sea and Coast Fisheries of Ireland: for which donations the usual thanks of the Council were ordered.

Council Meetings. — Mr. Miles, M.P., having informed the Council of the great inconvenience with which those of their members who were in Parliament were now enabled to attend their meetings, in consequence of a change which had been made in the arrangement of the public business of the House of Commons, by which the country bills were brought under their consideration on the Wednesday, gave notice that, at the monthly Council in May next, he should move an alteration in that part of the Bye-laws of the Society which prescribes the day and hour of the meetings of the Council.

The Council then adjourned to Wednesday.

A Weekly Council was held at the Society's house in Hanover Square, on Wednesday, the 22nd of March: present — Mr. Raymond Barker, in the Chair, Sir John Johnstone, Bart., M.P., Mr. Bramston, M.P., Dr. Calvert, Mr. F. C. Cherry, Mr. Sandham Elly, Mr. Fuller, M.P., Mr. Fisher Hobbs, Mr. R. Jennings, Mr. Kinder, Mr. Majendie, Mr. Miles, M.P., Dr. Newington, Mr. Parkins, Prof. Simonds, Mr. Reynolds Solly, Mr. E. Tull, Mr. Thomas Turner, Mr. Tweed, Prof. Way, and the Rev. J. C. Wharton.

Dibbling.—Dr. Newington, a Member of the Society, residing at Knowle Park, near Tonbridge Wells, presented to the Society one of the Economic Hand-dibbling Machines of his invention, and favoured the members on that occasion with an explanation of what he conceived to be its peculiar advantages, as well as with a detailed statement of the satisfactory results, in the economy of seed, its regular and proper deposition, and the free and vigorous growth of the plants, which, in his opinion, would be found to attend its use. He also called their attention to the practice of frequently stirring the soil between the rows of a crop, for the purpose of promoting the free ingress of atmospheric air, and thus accelerating the decay of dead vegetable matter as manure, and exerting a most beneficial influence on the

growth and character of the living plants.—The thanks of the Council were voted to Dr. Newington for his attention in making this present, and in submitting these statements to their notice.

Sulphate of Lime.—Mr. Majendie submitted to the inspection of the Council a sample of sulphate of lime—a substance which in its native mineral and impure state is well known to farmers under the name of gypsum or plaster of Paris, but which as an artificial and pure compound of sulphuric acid and lime is known to chemists as sulphate of lime. He stated that this sample of sulphate of lime was obtained as a refuse by the tallow-chandlers in their process of making the "composition" candles, and was to be purchased at a cheap rate. Its peculiarity consisted in the minute state of division to which its particles were reduced by that chemical process, a condition which it was conceived would greatly accelerate its action when applied as a dressing for the clover crop. Professor Way had made for Mr. Majendie an analysis of this substance, and found it to be composed as follows:—

Sulphate of lime	66.40
Free sulphuric acid	3.18
Accidental water	17.01
Combined water, and a little fatty matter	12.86
	99.45

Mr. Majendie at a future meeting would report the price at which it could be obtained as an article of commerce. Professor Way, who was present, explained, that the tallow-chandlers, in order to obtain from tallow the stearine, of which their composition candles were made, boiled the tallow along with quick lime, for the purpose of effecting that separation; and that the quick lime was afterwards precipitated by means of sulphuric acid, and formed the sulphate of lime in a highly comminuted state, of which a specimen was then submitted to the Council by Mr. Majendie. He regarded this sulphate of lime as bearing the same relation to the common gypsum as the super-phosphate bore to the common phosphate.

Maltese Clover.—Mr. Majendie also presented to the Council some plants (with roots and earth attached) grown in his garden at Hedingham Castle, from the seeds of a plant known at Malta as the Sulla or Maltese Clover. He also presented a supply of the seeds of the production in question, which he had ascertained to be known to botanists as the Hedysarum coronarium.—

Thanks having been ordered for these communications, and for presents made to the Library by the Earl of Lovelace and Mr. Sandham Elly, the Council adjourned to Wednesday, the 29th March.

NEW MEMBERS.

Baker, George Williams, Park Farm, Woburn, Beds
Barker, H. B. Raymond, Garden-court, Temple, London
Beck, John, jun., Congham, Castle-Rising, Lynn, Norfolk
Bragge, Colonel, Sadborough Park, Chard, Somerset
Carrington, F. A., Henrietta-street, Covent-garden, London
Chandler, Henry, Salford, Manchester
Chatterton, William, High-Risby, Barton-on-Humber
Dawson, G. P., Osgodby Hall, Selby, Yorkshire
Deane, John, King William-street, City of London
Deane, George, King William-street, City of London
Dray, William, 46, King William-street, City of London
Ewings, William, Manager of the Bloomsbury Br. of the Lond. and Westr. Bank
Grove, Dr., Fern, Shaftesbury, Dorset
Hoskison, John, Mayou, Wilnecot, Fazeley, Staffordshire
Hubbersty, John, C. E., 34, Blandford-square, London
Hunt, Henry John, High-street, Lambeth, Surrey
Jeggo, Thomas Bayley, Gosfield, Halsted, Essex
Jordan, Francis, Easton, Bridlington, Yorkshire
Kinderley, Geo. Herbert, 10, Bedford-square, London
Kyrke, Richard Venables, Pendwll Cottage, Wrexham, Denbighshire
Levick, Henry, West Woodhay, Newbury, Berks
Lopes, Massey, Maristow, Plymouth, Devonshire
MacLean, Allan, M.D., Colchester, Essex
Milne, David, York-place, Edinburgh
Newington, S., Knole Park, Frant, Tunbridge Wells
Parson, George John, Haslemere, Surrey
Paul, Joseph, Thorpe Abbots, Scole, Norfolk
Prickett, Rev. Josiah I., Markington Parsonage, Harrogate
Penrice, Thomas, Kilvrough, Swansea, Glamorganshire
Read, Richard, 35, Regent Circus, London
Reddaway, John, Inward-Leigh, Okehampton, Devon
Richardson, Joseph, Woodside, Luton, Bedfordshire
Richmond, Francis, Salford, Manchester
Strahan, William, Ashurst, Dorking, Surrey
Stock, Samuel, Blackley Hurst, St. Helen's, Lancashire
Turner, Lieut.-Col. Henry, 32, Argyle-street, London
Vivian, John Henry, M.P., Singleton, Swansea, Glamorganshire
Walker, David, Master of the Agricultural College, Maidstone
Webber, Thomas, Escott Lodge, Honiton, Devon
White, John Mould, Mickleover, Derby.

LONDON FARMERS' CLUB.

TO THE EDITOR OF THE MARK LANE EXPRESS.

DEAR SIR,—In reading the report in your paper of the remarks I made at the discussion on draining at the London Farmers' Club, I observe that by the alteration of a few words in two sentences the sense of what I stated has been materially altered. Your report says—

"And so eager were they to have their land drained, that seventy men were then employed upon the work, and would probably continue so until the whole had been completed. So great was the benefit derived, that some of the tenants had informed him that even if they had to pay double or treble the present charge, they would still be eager to purchase such an advantage."

Whereas it should have been—

"And so eager was he to have the land drained, that seventy men were then employed upon the work, and would probably continue so until the whole had been completed. So great was the benefit derived that he had been informed that even if they had to pay double or treble the charge, they would still derive an advantage."

Trusting you will find room for this in your next paper, I remain, dear sir, yours very truly,

London, March 22. W. FISHER HOBBS.

FARMING PROSPECTS IN THE NORTH.

"A peck of March dust is worth its weight in gold." This old adage is founded on reason, and is substantially correct; for without dry weather this month our Lent corn cannot be got in: everything is thrown late, and a backward and precarious harvest is the usual consequence. We have this season, now, no chance of a grain, let alone "a peck of March dust." On the 14th, the country was beginning to look as if it would dry sufficiently, with the assistance of another week of sunshine, to enable the farmer to commence operations, and his almost exhausted patience was likely to be rewarded; but woe, woe, woe! despair now reigns triumphant on his furrowed brow, a deep gloom has settled in his eye, and all within and without is black and threatening. A deluge of rain has continued pouring for two days, and the whole country is in a swim. No spring wheat has been sown, and no oats can be sown for a fortnight to come; all the exertions of the most spirited will not enable them to get their seed in before the middle of April, and thousands of acres will even then be to plough for barley. The immense crop of turnips has taken so much consuming, that a great breadth of land is still covered, and cannot be got eaten. An unprecedented quantity of barley must, of necessity, now occupy our turnip quarter, a large portion of which would, if weather had permitted, have been sown with spring wheat. This will, of course, next year reduce the yield of the latter grain in the worth; but as the producing of wheat depends much more on the winter crops, the defalcation thus produced may not have a great effect on the total yield of the country: but "every little helps." A much more serious effect is likely to occur from the continued wet weather; and this really awful visitation coming just when the winter wheats were beginning to feel the influence of spring, will have a most pernicious effect, both retarding their growth and stunting their vigour. As a very large proportionate quantity of the last crop has already gone into consumption, any serious retarding of next harvest will naturally exhaust the available quantity of wheat, which is on the whole below an average yield; and we may again see our population reduced to the verge of famine. A great rise in the market is the probable and only safeguard, causing an immediate reduction of our somewhat lavish consumption, and an extra importation of the necessary food of our laborious millions. Our markets are already beginning to feel the prospect, and are steadily rising. Our stock markets continue well supplied, and prices high, but for some time are likely to feel a slight depression. As the time is approaching when our farmers get through their winter food, and are obliged to force their fat stock on the market, yet this will not be so much the case as in ordinary years, the great supply of turnips enabling many to keep on their cattle a month or two longer than usual. All sorts of farm work, except carting manure and thrashing, is very far behind; and when dry weather is vouchsafed to us, the greatest bustle and activity will prevail on all sides. Everywhere our servants are reverting to the practice of taking a quantity of land in potatoes as part of their yearly engagement, preferring it to any amount of money compensation. Wages are much as last year. Draining advancing all over the district, quite changing the climate and appearance of our wet moor edges and low bottom lands. Both stall and box-feeding has been tried, and will continue to have their advocates; but it is difficult from a want of summer soiling to put down our straw in this way, and if it ever be largely adopted, it will not be for many years. G. D.

Wooler, March 16.

ROYAL FARMERS' INSURANCE COMPANY.—PETERSFIELD.—William Shaw, Esq., the managing director of this institution, met about 50 of the shareholders, residing in the neighbourhood and attending the market at Petersfield, on Wednesday last, to explain the present state and prospects of the company. Fielder King, Esq., of Buriton, having been called to the chair, introduced Mr. Shaw to the meeting. Mr. Shaw then addressed the shareholders, and gave them a detailed and remarkably clear exposition of the state of the company's affairs, and the proceedings of the directors from the establishment of the institution to the present time. He particularly adverted to a contemplated increase in the business and paid-up capital of the company, and closed his address, which was listened to with great attention, with an offer to answer the inquiries of any shareholder who might require further information. Mr. Shaw having answered the inquiries made by — Shearer, Esq., of Swanmore House, Hants, and other shareholders, in a most satisfactory manner, Thomas Bowles, Esq., of Midhurst, after adverting to the statement and exposition given by Mr. Shaw, concluded a neat speech by expressing his confidence in the board of directors and their proceedings, and his conviction that the course pursued by them was entitled to the support of the shareholders. He (Mr. Bowles) thought it fair to state that he had an interest in the prosperity of the institution, to the extent of 150 shares, which he had no intention to part with, and he recommended all present to continue their support to the institution. C. C. Butterfield, Esq., of Petersfield, then proposed a resolution to the effect that "the shareholders present having heard the statement and explanation given by Mr. Shaw, were perfectly satisfied with the present and future prospects of the Farmers' Insurance Company." This was seconded by Mr. Bowles, and carried without a dissentient voice. The meeting then voted thanks to Mr. Shaw for his attendance, and the able and satisfactory manner in which he had carried out the objects of the meeting, and to Mr. King for his kindness in taking the chair.—Hampshire Telegraph.

We noticed, about a fortnight since, the visit of a Russian nobleman, Baron Firks, at our corn markets, and that it was his intention to visit Mr. Hudson, at Castleacre, and see the farms in West Norfolk, which the Baron did at Holkham and elsewhere. It seems that the visit to Mr. Hudson had also another object—the Baron having been deputed to announce to this well known agriculturist that he had been elected an Honorary Member of the Agricultural Society of Churland. The diploma, as it is called, is thus worded:

"The Economical Society of Churland have unanimously elected John Hudson, Esq., of Castle Acre Lodge, in the county

of Norfolk, as an honorary member, and have accredited the same with the signature of their Select Committee, under the seal of the Society. Mitau, the 10th October, 1847.

"Vice-President—Baron Offenberg.

(Signed) Lollegierrath von Braunschweig,

"Perpetual Secretary of the Agricultural

"Society of Churland."

The following handsome letter accompanied the testimonial, with the rules of the Society: the latter we shall notice next week.

"John Hudson, Esq.

"Sir,—For the friendly reception and information kindly afforded by you last summer to one of our members, M. Von Behr, our Society feels itself much indebted, and begs to offer you its sincere thanks.

"In a meeting held on the 2nd of October, after hearing the communication of our above-named member, it was unanimously resolved to elect you an Honorary Member of our Society; and you are hereby requested to accept of the accompanying diploma as a mark of the high esteem and respect entertained for you by our Society. Mitau, 10th October, 1847. In the name, and by order of the Churland Agricultural Society. Braunschweig, Secretary."

With a friendly compliment for John Hudson, Esq., from the Baron Frederick de Behr.—Norwich Mercury.

WHITE LUPINE—GREEN MANURE.

Sir,—Having been long, on both chemical and economical grounds, an advocate of green manuring, I was glad to see, in a recent number, that Messrs. Keeling and Hunt had imported lupin seed for this purpose; which I apprehend to be the most powerful of those manures. But some opposition having appeared, I have waited the opinions of practical men before offering you any communication on the subject.

The white lupin has been largely used in Italy for this purpose, down, I think, from the time of ancient Rome. It is ploughed down when in flower, and much noticed by agricultural travellers; and the following summary of its properties is from Professor Johnston's "Agricultural Chemistry and Geology," 2nd edition:—

"In Italy and the south of France, the white lupin is extensively cultivated as a green manure; in Germany, also, it has been found to be one of those plants by which unfruitful, sandy soils may be most speedily brought into a productive state. The superiority of this plant, in enriching the soil, depends upon its roots, which descend more than two feet beneath the surface; upon its being little injured by drought, and little liable to be attacked by insects; on its rapid growth; and upon its large produce in leaves and stems. Even in the north of Germany it is said to yield, in three-and-a-half to four months, ten to twelve tons of green herbage per acre. It grows in all soils, except such as are marly and calcareous; is especially partial to such as have a ferruginous subsoil; and besides enriching, also opens stiff clays by its strong stems and roots."

A more detailed account, with an analysis, is found in Sprengel: "Dunger," p. 258.

Whether the seed imported by Keeling and Co. is the white variety, or another equally efficacious, I think it well deserves a fair trial; and from its unpalatableness to vermin, it is not unlikely to destroy that agricultural pest, the wireworm. On shallow soils it promises the less, as its deep rooting seems to be a principal recommendation; and how far it may suit our climate we have yet to ascertain, for which the present offers a fair opportunity.

I shall willingly communicate further particulars of its mode of employment in Italy, if required.

I remain, sir, yours, &c.,

J. Prideaux.

PETERBOROUGH.—At the monthly meeting of the Farmers' Club, held on Saturday, 11th March, Mr. E. Leeds in the chair, the question being, "How the moral and social condition of the agricultural labourer can be best improved?" it was resolved:—1. That regular and remunerative employment is essential to the welfare of persons deriving their subsistence from labour.—2. That labour is chiefly provided by farmers in this part of the country, and to furnish work to the increasing population involves the additional application of capital to the cultivation of the soil; but this cannot be done so profitably or adequately unless a just system be established by law, so that whilst the rights of the landlord are fully recognized and respected, security may be also afforded to the unfettered employment of capital by the tenant.—3. That an alteration of the law of settlement is required.—4. That it would be beneficial to labourers on farms of more than 200 acres in extent if two or more cottages, containing not less than four rooms in each, were built on, or contiguous to such farms, and let to them at a moderate rent.—5. That every cottager should have a garden attached to or near his dwelling.—6. That agricultural labourers should be recommended to train up their daughters with a view to their being occupied in domestic service, and every endeavour should be made to give them a knowledge of household duties.—7. That boys intended for farming work should, after the age of ten years, be engaged in field or manual labour, to endure them with bodily strength and requisite ingenuity, and that merely intellectual education should, after that period, be only imparted at night schools, or in connexion with religious worship on the Sabbath.

IMPROVEMENTS IN THE MANUFACTURE OF SULPHURIC ACID.—M. Schnieder presented a paper to the Paris Society for the Encouragement of the Arts, on a new system of producing sulphuric acid from sulphurous acid gas, without the use of leaden retorts, or any of the nitrates, or nitric acid—he makes use merely of atmospheric air, without any intermediate agent, extracting all the oxygen necessary for converting the sulphurous acid gas into sulphuric acid. M. Schnieder carried out an experiment before the chemical committee of the society. He employed prepared pumicestone, distributed among various recipients, and added water, through which the gas and vapours had to circulate; all the openings of the different vessels having been closed by hydraulic means, the sulphur was kindled, and the combustion continued without interruption. All the acidified liquors were then mixed, to form a common sample—the absence of all nitrogenous compounds in the liquor was declared to be complete; and the committee came to the conclusion, that sulphuric acid can be made without any nitric acid, or nitrates. That the quantity of acid obtained from a given quantity of sulphur consumed, approaches the maximum under the old method, and that the inventor's preparation is so powerful, that he engages to supply, for several years, the prepared pumicestone, and revivify it. By this process, it being so exceedingly simple, every one will be enabled to make his own sulphuric acid.

SHEEP FARMING.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—In an article on sheep farming, page 147 of the February number of the *Farmer's Magazine*, extracted from the *Sherborne Journal*, the Rev. Mr. Cosins is reported to have stated that Mr. Sotheron, M.P. for Wiltshire, fattened 800 sheep on 200 acres. Now, Sir, this information, otherwise so valuable, is in a great measure useless by the omission of three most important particulars, viz., How many acres of the 200 were devoted to the cultivation of the turnips; the species of turnip and manure used; and finally, whether the sheep were penned on the turnip ground or pasture land.

Should the rev. gentleman be pleased to supply the above-mentioned omissions in the next number of your journal, with such further particulars as may arise to his mind, he would confer a very important benefit and favour on many farmers in the south of Ireland, who are now anxiously striving to effect a better state of things.

I have the honour to be, sir,
Your very obedient servant,
A CONSTANT READER.

County of Cork, Feb. 28, 1848.

ANSWERS TO AGRICULTURAL QUERIES.

ALUMINA IN POTATO CROPS.

SIR,—In reply to the inquiry as to my authority for stating at page 235 that "alumina is a *rather* important constituent of the potato," I may state that according to Sprengel's analysis (*Journal of the Roy. Ag. Soc.*, vol. 3, p. 158) the crops which usually rotate with potatoes carry off alumina from the land as follows:—

Per acre.	Stones.	Alumina.
Wheat, 30 bushels	= 135 contains	7⅝ oz.
Barley, 40 bushels	= 160 „	nearly 9 oz.
Clover, 3 tons green	=	3¾ oz.
Potatoes, 300 bushels	=	18 oz.

Thus, though the given quantity of alumina in 100,000lbs. of potatoes may be relatively a few pounds less than in wheat and barley, in the crop carried off, the real privation of the land, it exceeds wheat three times and barley by twice, and clover six times; and therefore alumina is a rather important constituent of a potato crop.

M. M.

* * * * * * *, *Thirsk, March* 17, 1848,

CULTIVATION OF COMMON SAINFOIN.—Sow in the early spring with your barley (having previously your land in good heart, clean, and in fine tilth), and roll-in the seeds. The best mode of sowing is broadcast. A sack of four bushels to an acre, in husk. The present price of seed is about 4s. 9d. per bushel in husk. About 3lb. of yellow clover, and 1lb. of beets should be also sown with the sainfoin, to add to the bulk of the crop the first season. It would be useless for your correspondent to speculate on this crop, unless there be plenty of chalk in his soil; and, if a good calcareous soil, it will last from seven to nine years, especially if well dressed with farm-yard manure and ashes. Your correspondent's statement of his soil, and purpose, emboldens me to suggest lucerne as a crop more suitable than sainfoin for his object.

West Surrey. W. F.

SIR,—In answer to your "Constant Reader," who wishes to know the quantity, price, and best mode of sowing sainfoin, &c., I would observe—First, let him, if possible, drill three bushels per acre, during the first fortnight in March; that being the best time, provided the weather is dry, although it will answer very well up to the end of April. In case he does not drill, then four bushels per acre will be necessary to insure a full plant; and let him be careful to get new seed, as old will not germinate. This I have proved. He should then obtain his seed of a grower of known integrity. As to price there is often great fluctuations: it is sold sometimes as high as seventy shillings at the end of the season, when the price at first has scarcely reached forty shillings per qr. I should think this year it will reach between fifty and sixty shillings, as, in consequence of the low price of wheat, and comparative high figure for sainfoin hay, many thousands of acres will most probably be sown with this very nutritious and prolific grass, the value of which, on all chalk and dry loam subsoil, is well known, producing very often three tons per acre of hay, containing more saccharine matter than either meadow-grass, lucern, or clover, and, as regards the aftermath, capable of fattening sheep or beasts without either cake or turnips.

Further information may be obtained by addressing a letter to "W. W., Post-office, Dartford, Kent."

Fawkham, Feb. 25, 1848.

SPALDING FARMERS' CLUB.—At the meeting of the Farmers' Club, at the Assembly Rooms, White Hart Inn, Spalding, on the 15th March, Mr. T. Fountain, chairman, it was determined that this club should join the Central Club in London, as a means of extending and increasing its utility, and of furthering the objects for which it was formed. After the election of several new members, the proposed subject was brought forward by Mr. Aitkin: "On the Use of Agricultural Implements." On the generality of implements there was a unanimity of opinion as to their use. With respect to waggons and carts, there was some diversity of opinion, but although it was thought that a waggon must be retained on most farms, the prevailing impression of the meeting was that carts would soon almost supersede the use of waggons. As a general resolution, applicable to most implements, the following was unanimously agreed to:—"That the great test of the value of implements is the amount of force required for their use, and that therefore it is desirable the Club should possess a proper instrument for determining that fact." The speakers were Mr. Aitkin, Mr. Parr, Mr. Holland, Mr. Lake, and Mr. Fountain. The following subject was proposed by Mr. F. Millns, for discussion at the next meeting:—"On the most efficient application of manures for the production of a green crop"

METEOROLOGICAL DIARY—1848.

	Barometer.		Thermometer.			Wind and State.		Atmosphere.		
Day.	9 a. m.	9 p. m.	Min.	Max.	9 p.m.	Direction.	Force.	9 a. m.	2 p. m.	9 p. m.
	in. cts.	in. cts.								
Feb. 21	29.86	29.76	31	42	40	Westerly	gentle	fine	sun	cloudy
22	29.60	29.28	40	49	42	S. West	brisk	cloudy	cloudy	fine
23	29.20	29.40	40	48	44	N. W., S. W.	strong	fine	sun	cloudy
24	29.40	29.30	43	50	47	W.S.W.	strong	cloudy	cloudy	cloudy
25	29.21	29.21	44	52	45	W.S.W.	gentle	cloudy	sun	fine
26	28.95	29.40	44	47	43	Westerly	brisk	cloudy	cloudy	fine
27	29.65	29.20	41	50	45	S. West	brisk	cloudy	cloudy	fine
28	29.20	29.50	45	52	42	W., W. by N.	lively	cloudy	sun	fine
29	29.56	29.10	37	48	43	S. West	brisk	fine	sun	cloudy
March 1	28.90	29.—	36	44	38	S. West	variable	cloudy	cloudy	fine
2	29.20	29.54	36	43	40	N. N. W.	lively	cloudy	cloudy	cloudy
3	29.90	30.10	37	50	41	N. by East	gentle	fine	sun	cloudy
4	30.14	30.10	31	47	38	Southerly	gentle	fine	sun	fine
5	29.92	29.84	36	40	38	S., N. by E.	gentle	cloudy	cloudy	cloudy
6	29.90	29.90	37	44	40	W. by N.	gentle	cloudy	cloudy	fine
7	29.95	30.20	35	45	37	S. West	verybrisk	cloudy	cloudy	cloudy
8	30.30	30.20	30	42	40	S. West	gentle	cloudy	cloudy	cloudy
9	30.04	29.90	37	48	40	S. West	gentle	cloudy	cloudy	cloudy
10	29.55	29.55	37	48	40	W. by N.	forcible	fine	cloudy	fine
11	29.16	29.0	37	46	36	W. by N.	forcible	cloudy	cloudy	cloudy
12	28.90	29.03	36	45	38	W. by N.	lively	cloudy	cloudy	cloudy
13	29.30	29.50	36	40	38	N. West	lively	cloudy	cloudy	cloudy
14	29.79	29.90	37	46	37	North	gentle	fine	sun	fine
15	29.80	29.70	34	45	40	S. W., N. W.	gentle	cloudy	cloudy	cloudy
16	29.60	29.59	36	42	38	N. by W.	gentle	fog	fog	cloudy
17	29.59	29.50	34	40	38	South by East	gentle	cloudy	cloudy	cloudy
18	29.50	29.46	37	52	43	East by South	gentle	fine	sun	fine
19	29.53	29.20	31	52	42	S.E., S.	variable	fog	sun	cloudy
20	29.13	29.12	36	50	42	S. West	lively	cloudy	sun	fine

ESTIMATED AVERAGES OF MARCH.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.77	28.87	66	24	43.90

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
46.482	37.	41.741

Weather and Phenomena.

Feb. 21: Hoar frost, ending in drizzling rain. 22: Heavy clouds; showers; evening fine. 23: Fine; changeable; fitful wind. 24: Showers. 25: Showers, with fine intervals. 26: Great fluctuations; very much rain. 27: Some profuse showers. 28: Thunder-shower, not heavy. 29: Fine forenoon; wet evening.

Lunations.—Last quarter; 27th, 8h. 22m. morning.

March 1: Much rain early. 2: Cloudy till 7 p.m.; rain in the evening. 3: Wet in the past night; fine day. 4: White frost; clear day, with noble clouds. 5: Rain at night, and continued. 6: Changeable; fine evening. 7: Fine day; rich sunset. 8: Morning rime; red clouds about sunrise, succeeded by rain. Here the finer weather ceased. 9: Gloom; some rain. 10: Showers, and wind till 3 p.m. 11: Rain, sleet, hail, and two rolls of distant thunder. 12: Showery. 13: Drying and fine morning; afternoon wet. 14: Fine throughout. 15: Wind and rain. 16: Misty, with small rain. 17: Wet till nearly sunset. 18: Fine and genial. 19: Hoar frost and mist; fine sun till noon, then showery. 20: Equinox at 11h. 16m. a.m.; brisk south-west breeze; gleams and showers.

Lunations.—New moon: 5th, 1h. 17m. p.m. First quarter: 12th, 4h. 41m. morning. Full: (totally eclipsed, partially visible only) at 9h. 19m. in the evening.

REMARKS CONNECTED WITH AGRICULTURE.

The condition of the growing crops may be reported as stationary; for, mild as was the winter,

there has been little solar stimulus. During the 20 days of March, we can count only four which have been sunny; and during the entire period of the above register, we perceive but seven. Corn, therefore, though healthy, is backward. Concurrent evidences testify that so wet a March has not been noticed during forty years. The spring equinox just passed has been decidedly wet and windy. Without offering any opinion, fears may be entertained; and therefore our country readers are requested to watch attentively the *comparatively* earlier vegetation of the *oak* and *ash-trees*. We may thereby obtain something like a trustworthy and philosophical prognostic.

JOHN TOWERS.

Croydon, March 20th, 10 p.m.

CALENDAR OF HORTICULTURE.—APRIL.

At the date in which this article commences the weather is so wet that doubts must be entertained of future progress, and we must wait the issue of the critical period of the vernal equinox. As a retrospect, it can only be said that all the great gardens abound with plants of the cabbage family, fine and large; that the stock of excellent roots, parsnip, carrot, turnips, is ample, and that of potatoes more so than could have been anticipated. The ash-leaved kidney is, to a certain extent, planted, and disease must not be dreaded. Our final remarks will complete the retrospect.

MELONS AND CUCUMBERS.

Hotbeds suffer so much from wind and rain—the labour of weeks being frequently rendered abortive in a few hours—that we could wish to avoid these troublesome instruments of heat by the substitution of covered pits heated by tanks or warm air. The erection, the plan of which was given at the close of the March calendar, would be very available; but as experience of long standing has proved the efficacy of dung and leaf-beds, and these substances must be used on every farm and in every garden, and, moreover, it being certain that the heat developed by fermentation is by far the most genial, it only remains to impress the necessity which exists of covering the beds by tarpauling over dry straw, or fronds of fern, and, if at hand, of close-worked straw-mats or hurdles. Melons are now advancing, and must be stopped whenever the few selected main shoots approach the sides of the frames or pits. Cucumbers, to obtain plenty of fruit, should be nipped back at every joint where a fertile blossom and tendril are observed, because at that joint the embryo of a new shoot is always present, and this, if cautiously pinched, will produce a fruitful lateral. MacPhael first impressed this fact, and proved that if the existing shoot be permitted to advance it will be barren, and to an extent that cannot be predicted. The art, therefore, of cucumber growing consists in selecting a small number of powerful leading shoots at their first starting off, and then to obtain fruitful laterals, by arresting the progress of elongation by stopping the direct leader at the point where a fruitful blossom is formed.

IN THE KITCHEN GARDEN

The directions for March will still apply, to which others are appropriately added; and the first of these will refer to the plots or beds of asparagus. Here I take advantage of an article which appeared in page 172 of the *Gardener's Chronicle*, March 11. It refers to the different methods of treatment practised by the market gardener and the gentleman's garderer, for "the former covers *early in the spring* the surface of his beds to a considerable depth with earth taken from the alleys between them, leaving the tops of each smooth and flat, in which form they remain during the growing season." The gentleman's gardener, on the contrary, "chooses autumn as the time of earthing, and in the spring he forks the soil off again, leaving his beds in the shape of a half cylinder, with the convexity presented to the sun." The writer appears to question the necessity of "covering at all," and on this practice the late William Cobbett would have confirmed his suspicion; for, in speaking of the absolute hardihood of the plant in reference to covering, he observed that it required "neither beds nor blankets;" its roots if dug up and exposed to the open air, had withstood the utmost rigour of a winter, and retained vitality in the following spring. Mr. Sherwood justly repudiates the practice of covering or manuring in the autumn and winter, at a time when neither can avail, and the plant is entirely inactive. On the contrary, he believes that the market gardener by covering in March (or early spring—and it is not now too late) places the crowns of his plants in a temperature far more congenial than that to which the alternations of April's daily sunshine and nightly frosts subject them. The writer, so far as his arguments extend, is perfectly correct in his inferences; but he forgets that the deep spring-earthing-up of the market growers is much influenced by the bad taste of the London consumers, which prefers an elongated stick of pack-wax tipt by an inch of almost flavourless edi-

ble matter. Now, to produce such poor rubbish, a great depth of covering earth must be laid over the crowns. We, of the country, who require and enjoy six inches of highly-flavoured tender green "grass," are, or ought to be, contented with clearing off weeds, loosening the surface soil, laying on it a three-inch stratum of decaying leaves and dung, or what is better, perhaps, digging out the dung of last year from the alleys, and replacing it with an increased quantity of half fermented stable or farm-yard manure. Thus, every condition will be fulfilled, unless we may add that of scattering a copious dress of dry common salt over the whole surface of the beds, rows, and alleys. No salt should be risked after the grass shall appear above ground.

Potatoes.—Plant all the store stock; be early with every sort, and avoid direct contact of manure with the tubers or sets.

Lettuces.—Transplant, if too close in the beds or frames; sow the more delicate varieties in very rich ground. Mustard, cress, and radishes of all kinds, are sown at any time of the month.

Kidney beans.—Dwarfs or runners are the most essential crops, because they may now be much advanced by sowing the beans very near to each other in pans or pots, using fine and nearly dry earth, and keeping them under cover; thus not one good seed will be lost; whereas, if deposited in the open ground, decay will be risked, unless unexpectedly fine weather succeed. When the beans have sprouted and exposed the leaves, they will have gained so much time, and may be transplanted by the third or fourth week.

Plant cabbage and savoys for full crops; also cauliflowers in rich soil.

Sow broccoli twice or thrice for autumn and winter consumption.

Celery.—The young plants raised in heat can be pricked out to become stocky; more seed of the red and white sorts should be sown under hand-glasses.

Sow nasturtiams; also parsley, basil, burnet, fennel, and marigold.

Plant thyme, marjoram, balm, camomile, and root-slips of every favourite sort of sweet herbs. This month in its course is very suitable to the sowing and planting out of almost every vegetable.

Fruit Department.

Grafting of apples and pears can yet be performed, particularly if the weather be moist; but the scions should have been detached a week or two previously. The amateur gardener would find it advantageous to adopt the method called "crown" or "rind" grafting, it being most facile and successful in its results; but one precaution should be attended to; it consists in opening only one side of the slit made by the budding-knife in the bark of the stock, and thus retaining one smooth face of it, against which a corresponding edge of the pared scion may rest flush, so that the juices of both may become more completely in contact. I presume that the reader knows what "crown-grafting" is; if he do, he will remember that operators generally thrust the "messenger," as it is styled, down the centre of the slit, and then pass the graft down that central opening, by doing which the graft is hidden, and its dry outer skin is covered by the moist under surface of the stock's bark. On the contrary, the entire moist surface of the two members ought to repose on each other, and the graft be covered and secured by the bark that is raised on one side only.

Fig-trees.—In the beginning of April the covering, of whatever kind, should be removed, and the unfruitful shoots of last season shortened to a foot, or rather more, according to their strength. The shoots that will then be produced must be trained a foot apart. These are the directions given in G. Lindley's "Guide;" but, in fact, discretion, according to locality, must direct individual practice; the treatment to be given in August will, in general, regulate the fertility of the tree in the following year.

Wall-fruit.—Dis-budding will soon be required; but, as yet, it would be premature. If, however, insects or mildew threaten, let the shoots be liberally dusted with Scotch snuff and flower of sulphur. The soil of these trees is too little attended to; a renewal from time to time by fresh fibrous loam from a common, added by degrees, will keep the trees in healthy condition, but without that rank and over vigorous growth which is antagonistic to fertility.

The vines must be watched; they are not likely to be in advance, and the season, though not frosty, promises to be chilling and late. However, a warm sunny April *may* supervene, and then the young shoots will require attentive care to select, to protect, and, so soon as their extreme tenderness will permit, a regular distribution. The first crops in the vinery will be either ripe or nearly mature. Air, during fine intervals, will confer colour and flavour. A few words upon "shanking" and "shrivelling" may be permitted. We are not *sure* of the cause or causes—it is fashionable now to ascribe these defects to soil—but the fact cannot be resisted which proves that if two vines of the same variety are planted in the same soil and site, so close together that their roots shall interlace, the one passing into a glazed house, the other being trained outside of it, the former shall, in eight cases

of ten, exhibit "shanked" clusters, while the fruit of the latter shall be entirely free from the defect! Again, it is equally certain that some varieties, particularly the white and grizzly Frontignans, are rarely to be trusted, as they shank off just at the period when the berries ought to acquire colour, and their juice its proper saccharine quality. Be the soil what it may, and the situation of the entire stem *interior* or *exterior* of the walls, we shrewdly suspect that the defect of "shanking" must be ascribed to unnatural treatment as respects the glass covering, and the agency it exerts in the modification of heat and refracted light, also the consequent irregularities of atmospheric air contaminated by gaseous exhalations. We cannot ripen our finest grapes without glazed roofs, therefore must submit to inevitable contingencies.

Floral Departments.

The plants in pits and the greenhouse must have more air, always regulated by the weather. Our erections are very defective, for air can scarcely be admitted without exposing the plants to rain and gusts of wind. The season of growth being come, re-potting must be attended to, since it is evident that without fresh food healthy growth cannot be supported. In re-potting, there should be as little disturbance or wounding of the roots as possible, and appropriate composts ought to be ready and at hand. The soil should be brought into close contact with the roots, that no hollows may be permitted to exist. Drainage is also of importance, and none perhaps is better than bruised charcoal and bits of broken crocks—half and half.

In the Flower Garden

Lawns should be thoroughly swept with a soft elastic broom prior to rolling; walks must be made and kept clean, then rolled, and box-edgings carefully clipped. The surface of all the beds and parterres (after digging or forking in of loam-leaf-mould and rotted cow-dung) must be nicely levelled and raked, and many annual seeds sown, herbaceous subjects planted or transplanted, small evergreens introduced, and many likewise of the American tribes. For the last, more or less of heath mould is required; the sandy earth of Mitcham Common, mixed with one-third part of that black soil which is obtained on the Addington Hills and Croham-hurst, we, of Croydon, find to be excellent.

The multitude of beautiful plants which are to be seen in every good nursery ground cannot even be named, but there is one plant which should be in every good garden where bedding-out is practised; it is *Cuphea platycentra*. This is one of the freest of bloomers, can be propagated with the utmost facility, and while beautiful in the tints of its pendulous tubular flowers, is unobtrusive in its habits of growth.

As a final retrospect, we can chiefly report the continuance of rain, and the total absence of a particle of *March dust*. This is the day of the vernal equinox—a critical period. The ground is saturated with water, and cannot be approached. The memory does not retrace so wet a month of March, but we may consider this abundance of rain as a compensation for the unprecedented drought of 1847. The springs will now begin to act.

March 20th. J. Towers.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR MARCH.

The unusually large quantities of rain which have fallen in all parts of England during this month have been productive of the most serious inconvenience to our agriculturists. The saturated condition of the soil has rendered it impossible to get upon the land in most of our large grain districts. The consequence is, that both ploughing and sowing are now more backward than we have known them at most previous corresponding periods of the year; in fact, in some districts no Lent corn has, as yet, been sown. We need scarcely observe that dry weather is now greatly to be desired; and, unless it should speedily intervene, the usual course of cropping upon some farms—especially those situate in damp localities—will be lost, at least for the present year.

The reports which have reached us, relative to the winter wheats, are quite as satisfactory as could be anticipated. In no one instance has it been found necessary to re-sow; and the plants, notwithstanding the comparative mildness of the atmosphere, are by no means too forward. The breadth of land under winter-wheat, owing, doubtless, to the high prices obtained during the greater portion of last year, is decidedly large, and certainly in excess of that of last season.

Unusually large quantities of grain have been thrashed out in the course of the month. The average yield of wheat has continued good; that of barley very large. Although the various markets

have been well supplied with the former article, the demand has ruled firm, and the quotations have advanced fully 2s. per qr. Barley and oats, as well as beans and peas, have met a very dull inquiry, at drooping prices.

The lambing season, in our principal flock districts, has gone on extremely well. The fall has been a good one as to number, and the losses by no means heavy; yet we are very apprehensive that we shall speedily hear of the foot-rot, from the damp state of the pastures. It is now a well-ascertained fact that the number of sheep at this time in the country is by no means adequate to our wants. The value of mutton continues to rule very high, with little or no prospect—even allowing for a considerable increase in the arrivals of foreign stock—of a decline in it for some weeks to come. We have already alluded at some length to the causes which have led to this state of things, and our advice to the graziers is, not to part with their sheep unless they are in a really marketable condition. To force large supplies of sheep to market in a half-fat state, at the present time, would be to entail a certain, perhaps, a serious, loss of money at a future time, besides enhancing the value of store animals far above its ordinary range. The supplies of dry fodder have been unusually abundant, and the prices of both hay and straw in the metropolitan markets have been low in the extreme.

Provisions in general have again sold at very high prices, and the imports from America, as well as the arrivals from Ireland, have again fallen off.

In Ireland and Scotland, the corn trade has been far from active. Wheat has mostly sold at extreme rates; but spring corn and meal have had a downward tendency.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

For the time of year, full average supplies of beasts have been on sale in Smithfield and the large provincial cattle markets held in the past month; hence the demand (particularly as the weather has proved very unfavourable to slaughtering) has been somewhat inactive, and the quotations have suffered a decline of quite 2d. per 8lbs.

The numbers of sheep brought forward have been smaller than almost ever recollected; hence the mutton trade has ruled firm at very full prices. That the supply of the latter description of stock in the country, from causes to which we have before alluded, is very small, does not admit of a doubt; consequently it is quite evident that its value during the whole of the present year will rule comparatively high.

The imports of foreign stock have been on a very moderate scale since our last report. At this no surprise can be expressed, considering the heavy losses sustained by the shippers during the greater portion of last year, and the high prices paid at this time in Holland. Parties just arrived from Rotterdam have informed us that the price of the best beef there is *fourteen pence per pound.* In that figure, however, is included the excise, or more properly speaking the town, duties; which amount to nearly *fifty per cent.* upon the cost value of the animals. For instance, if a bullock worth £10 to be slaughtered for consumption, the burgomaster imposes a tax upon it of £4 18s.! It follows, therefore, that meat is nearly twice as dear in Holland as in England. It must, however, be observed, that this tax is not imposed upon exports, which have caused a great advance in the necessaries of life during the last eighteen months in the whole of the Dutch ports. We understand that the arrivals of beasts and calves from Holland during the present year are likely to be good; but those of sheep will, doubtless, be on a very moderate scale.

The importations into London, since our last, have been as under:—

	Head.
Beasts	1,646
Sheep	2,341
Calves	434
Total	4,421

Those at the same time last year were as follows:—

	Head.
Beasts	1,495
Sheep	1,645
Calves	114
Total	3,254

At the outports the arrivals have been on a very moderate scale.

TOTAL SUPPLIES ON SALE IN SMITHFIELD.

	Head.
Beasts	15,407
Cows	601
Sheep and lambs	72,010
Calves	1,122
Pigs	2,225

CORRESPONDING PERIODS.

	March, 1845. Head.	March, 1846. Head.	March, 1847. Head.
Beasts	13,400	12,579	16,742
Cows	600	521	698
Sheep and lambs	122,400	77,010	84,650
Calves	396	731	907
Pigs	2,041	2,081	2,440

The bullock droves have been thus derived:—

	Head.
Norfolk, Suffolk, Essex, and Cambridgeshire	4,500
Northern, western, and midland districts	4,300
Other parts of England	1,600
Scotland	850

The remainder of the supplies have been derived from abroad and the neighbourhood of the metropolis.

With regard to the general quality of the beasts we may observe that it has turned out exceedingly good; but that of the sheep has not been to say first-rate.

AVERAGE PRICES.

Per 8lbs. to sink the offals.

	s.	d.		s.	d.
Beef ..... from	3	4	to	4	6
Mutton.....	3	8		5	6
Lamb	6	0		7	0
Veal	4	0		5	2
Pork.....	4	0		5	0

Up to Newgate and Leadenhall markets the arrivals of meat have been on a very moderate scale from nearly all parts of the country; yet the general demand has been by no means active. Beef has sold at from 3s. to 3s. 10d.; mutton, 3s. 6d. to 4s. 8d.; veal, 4s. to 5s.; and pork, 3s. 8d. to 5s. per 8lbs. by the carcass.

SOMERSETSHIRE.

When things are at a discount, less than a peck of March dust will be worth their ransom; if it were otherwise, up to this time we should have found some difficulty in procuring it; nevertheless, the old saying is a proof that a dry season in this month was considered of great value to our country, and up to this time this has been a period marked by heavy falls of rain, with but little intermission, which has greatly retarded the sowing of spring corn, and on heavy soils, and where there has been but little pass for the water, the wheat plant is partially gone; on the stone-brash, sand, and drily-situated clays, on the whole the wheat looks well, and, with a few exceptions, of a good colour. But it must not be lost sight of that the effects of too much wet are not immediately visible, for, should it set in dry for any lengthened period, especially on the stiff soils, the crops must suffer; and, should these cold rains continue, the cropping of spring corn will not only be retarded, but they will go in very badly, which, if followed by a dry, parching May and June, will be of serious consequence; whilst a few weeks' continuance of wet will tell in its effects on the colour of our wheat plants, seldom fully recovered by the after-fineness of the season. Without wishing to indulge any fears from the present aspect of things, the fact that we cannot look to any early crop of vegetables and other food is all but established, and with it a greater consumption of our last year's stock must be the consequence. To-day there seems more prospect of a change to dry weather, and it looks more cheering. Winter beans are looking well, and the more we can grow autumn-sown corn, we think, for heavy soils, the better and more certain will be the crops; for this purpose the new black barley will, we think, be valuable. Altogether, the lambing season has been a favourable one, but of the last year's there are some complaints of their scouring, and a good many have been lost. Poor sheep have been steady in price; little doing yet in their sale; fat ones are rather more abundant. The supply of beef has been rather more liberal, and the prices have barely been maintained. Pigs for fatting are quite as dear, but fat ones are not worth so much by 9d. to 1s. per score. Cows and calves have advanced fully £1 per head, and for fresh in-order barreners there are improved prices. The price of cheese has been stationary, with rather improved sales—42s. to 54s. and 56s. to 63s. for choice articles. In wool little doing; there is not much alteration in price. There certainly has been, for the last four weeks, an increased delivery of wheat, and, from the state of the weather, the condition has been variable, but not so improved as we looked forward to this month. It is evident that the consumption of bread-stuffs continues to be large, and the bakers soon run out of their stocks of flour, of which they at no time are large holders; and it will be generally found, in the corn trade, that parties hold much less stock than in former years. The price of flour is gone up from 38s. to 40s.; a good deal of business has been done at the latter price. Wheats varied from 6s. 9d. to 7s. for the best 62 to 63lbs. white, and 6s. 6d. to 6s. 9d. for the best red; inferior samples, 5s. to 6s. 3d., the higher rates being about present prices. Beans have been a complete drug, and not saleable at 4s. 6d. to 4s. 9d. for feeding purposes. Boiling peas have had no demand, and pigs' peas have not been wanted at 4s. 9d. to 5s. For barley for malting purposes there is more inquiry, as well as for seed; this corn has been cleared off better than was expected, as supplied to our markets. Oats have gone down from 24s. to 22s. for the best, and from 20s. to 17s. for inferior samples. For future prices, until within the influence of a promising and abundant harvest, we are rather disposed to think best white wheats will exceed rather than come under 7s. Cloverseed, good sort, not very plentiful; prices, 36s to 45s. and 48s.; dull sale.—March 24.

YORKSHIRE.

We delayed sending our usual report for a short time in order that we might, if possible, report a somewhat better state of things in the aspect of the weather and the prospects of the crops than we felt justice demanded from us, but unhappily there appears to be no cessation from the interminable wet and the dismal and low temperature, and even now the snow is falling rapidly (March 21). The wet season commenced six weeks ago, and there has been but little intermission of rains, floods, and cold piercing winds, and with only a day of sunshine now and then. The effect on the wheat plant is very serious. On the clay lands (undrained) the whole of the plant by the side of each furrow is irre-

trievably gone. A very old inhabitant, and cultivator of a drained farm on a clay soil, says, in a note to us, he never remembers the clay lands so very wet. The plant looks sickly and drooping, and the drains are in many places far from taking the water. The floods, in many cases, have overswept many scores of acres, and we fear on these great injury is done. We would not say so far, however, on the whole, that the wheat plant looks very different from what it did two months ago, we must confess; that on the strong soils much damage is done in the furrows and low parts we cannot but admit; but so far there is no general destructive process at work, but if the opinions of these vegetable physiologists be right that the ear of corn is formed in March, we may fear much that there will be anything but a productive harvest. On the lighter lands the wheat has not suffered so much, but on many soils which are usually considered dry enough the water will be observed to stand. We never recollect farm work so backward. It usually happens that barley sowing is quite general by this date, and we believe that neither barley nor oats, nor hardly any beans whatever, are got in, nor can even the usual ploughings be given to the land to prepare for any of these crops. All the seed is accumulated in the sacks, and the horses idle in the stable, while thrashing or indoor work is the only employment which can be going on. We can hardly conceive anything more wanted than genial drying winds, as the land will, in many cases, require much to get it into anything like working condition, and the farmers in all directions will be very busy when the fine weather comes. The turnips are now consuming fast. In the West Riding they were always a deficient crop, but they were unusually good in the north, so that many of the West Riding farmers sent their sheep to the latter place to turnips. Various modes of artificial feeding are resorted to for stock. Cake continues dear, so great is the demand, and many hundreds of farmers are adopting various processes of cooking the raw linseed. The samples of barley in Yorkshire have the past year been very superior; many of them have for some years been selecting the best samples from Mark Lane, and though they were giving some 10s. or even 15s. for their seed corn more than their neighbours, they have found it answer their purpose, but they find that every three years the samples deteriorate, so that fresh recourse is being had to the best selected samples. Markets for corn have a downward tendency, for though the outcry of injury to the wheat plant has been raised, the wet weather has increased thrashing operations and deliveries to the millers, so that the supplies at our inland markets are very heavy. Wheat varies from 6s. 6d. to 7s.; maslin, 6s. to 6s. 3d.; beans, 4s. 6d. to 5s. per bushel; barley, 32s. to 33s.; and oats, 20s. to 25s. per qr. Mutton is worth about 7d. per lb., and beef 7s. per st.—March 21.

NORTH-WEST OF CUMBERLAND.

The weather so far this year (with the exception of the two last weeks of January) has been very much inclined to rain. The month of February, in particular, was very wet, the rivers and brooks being continually flooded; and this month, so far, we have had more rain than usual. On Sunday last, towards evening, we had a heavy fall of snow, which covered the ground several inches thick, succeeded during the night and following morning by a sharp frost; but thaw set in about nine A.M., and without rain the snow was mostly gone before night, except on the mountains, which are still covered. We had sharp frost again this morning, but it is now thawing, though the day is cloudy and without sun. Owing to the wetness of the season spring field-work is in a backward state, as the ground has been in no condition either for cleaning for green crops, or for sowing the spring grain; and when dry weather does come, farmers will be extremely busy, and out-door work will alone be attended to: so that if there is to be any advance in the price of grain (which I very much doubt) it will take place during the months of April and May, when the markets will most likely be very lightly supplied with grain by the farmers, and there can hardly be much imported until after that time. The appearance of the winter wheat is in general yet good, though I yesterday saw some patches on land not thoroughly drained, that had a yellow and sickly look; and on such land, unless the weather soon changes for the better, wheat will suffer much. But, indeed, wheat should not be sown on such land until it is properly drained. On good land in good condition the growth of grass has hardly been stopped this season; and though turnips have rotted to some extent, there is no want of keep for either sheep or cattle, the sale for which, both fat and store, is good at high prices. Potatoes are more plentiful at present than they have been at any time during winter, and prices are now comparatively moderate, from 7d. to 10d. per stone of 14lbs., though some early garden sorts for seed are much higher. Potatoes will be planted here this season to a much greater extent than for the two previous years, and should they succeed, will be the means, with other causes, of reducing the price of grain lower than it is at present. The agricultural labourers have had, in general, constant employment at fair wages; but the workmen connected with trade and manufactures—more especially the hand-loom cotton weavers—have had but little employment for some time back, and to some extent have pressed on the poor-rate payers. The price of grain for several months has been very steady at what we in the north consider good prices, though, if anything, the price has tended downwards; and, except for seed oats, the prices are lower now than they have been since harvest. Wheat is selling at from 48s. to 60s. per qr.; barley at 27s. to 32s. per qr.; and oats at 20s. to 24s.; and best seed oats up to 28s. Beef is selling at 5½d. to 6d.; mutton at 5½d. to 6½d. per lb., sinking offal, and pork for curing at 5½d. to 6d. I see by reports in your paper that the farmers in several districts of the country are petitioning against the mode of assessing the income tax on them. Now, though I consider the income tax, as at present levied, a very unfair tax, I cannot think the farming interest have any cause of complaint in their profits being taken at half the rental, unless the profits from large farms are smaller in comparison than what

arises from small or middle-sized farms, with which alone I am conversant. For in this district I know many farmers who occupy farms at from £50 to £100 a-year, who make a respectable livelihood solely thereby; and if the profit was not at least half the rent, I cannot see how they could do so, as in this part small farms are always higher rented than large ones. Farmers may perhaps imagine that the tax is assessed on any profit left after family and personal expenses are paid; but if they came in contact with the surveyor and commissioners, they would soon find that all expenditure of that kind is considered profit, and charged on accordingly.—March 21.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF MARCH.

The weather was, during the first half of the month, excessively wet, and instead of the drying winds usually experienced in March, we had rain almost daily up to the 20th inst. The land is still saturated, and though the last few days have been favourable, some time must elapse before it can be brought into fit condition to admit of its being worked; hence a late seed time is almost inevitable. This is certainly anything but an auspicious commencement of the spring. A dripping February is all very well, but when followed by a wet March, as has been the case this season, fears are naturally entertained, not only of a backward spring, but also that the autumn-sown wheat may have been injured by an excess of moisture. Within the last week or two the reports respecting the appearance of the plant have become much less favourable than was the case when we had last the pleasure of addressing our readers. On all low lands, and on cold clay soils, the colour has changed from a healthy green to a yellowish brown, and the plant has in many instances run up spindly. These suspicious appearances might perhaps be followed by no great harm, if the fine weather which appears to have set in should last; but it must be confessed that the future is not looked to with such confidence as was the case only a month ago. Our position is therefore changed for the worse, and it is now no longer safe to predict that prices of bread stuffs may not undergo a trifling rise. When we last wrote on this subject, we qualified the opinion we then expressed by saying so long as nothing shall occur to give rise to uneasiness in respect to the next crop, prices cannot rise. The circumstances which have since taken place have had the effect of creating some slight apprehension; still we are inclined to think that a fine April might set matters right, in which case prices would probably undergo no great variation; though even then the tendency would, we think, for a time be upwards, owing to the necessity farmers will be under, so soon as a favourable opportunity offers, to employ all their time in bringing up the arrears of out-door work, which will of course prevent them supplying the markets freely.

The unforeseen events which have lately occurred on the continent must also have an influence on our prices. The revolution in France, and the disturbances by which this event has been followed in other continental countries, has interfered so much with the regular course of business, as to render it very improbable that affairs will for some time be established on their accustomed and regular footing, hence there is little chance of the supplies which, under other circumstances would most likely have been sent from the Baltic ports and elsewhere to Great Britain (on the first opening of the navigation) coming forward. The probability therefore is, that for a month or six weeks we shall not only have very short deliveries from our own growers, but that the arrivals from abroad will also fall considerably short of what had been calculated on. Such being the case, inauspicious weather might easily give rise to speculation, more particularly if there should arise any reason to fear a disturbance of the peace of Europe. Hitherto, however, no disposition has been manifested to enter into speculative purchases, and both sellers and buyers appear to be looking on, waiting to see what turn events may take, before they act with energy. One reason why the wheat trade has remained so quiet has unquestionably been the want of condition in the whole of that grown last year; for, notwithstanding the generally satisfactory manner in which the crop was harvested, the mildness of the winter, and the extreme humidity of the atmosphere since, have greatly deteriorated the quality of the produce of 1847. This has been the case to such an extent as to render it a difficult matter to meet with really good samples of wheat; and as merchants and millers are naturally unwilling to purchase largely of an article to which must attach an expense of constant working to bring it into anything like good order, much caution has been manifested by buyers.

In a subsequent part of this article we shall give a more detailed account of the fluctuations which have taken place in the value of wheat, and shall here conclude our remarks on the probable future range of prices, by reiterating what we already

intimated last month, viz., that everything will depend on the weather; but that we are firmly of opinion that the stock on hand of English and foreign together is sufficient for our wants if no alarm should be raised in regard to the next harvest. If nothing untoward occurs, we shall be sure to receive rather important supplies of wheat from the north of Europe, and of Indian corn from America, during the summer months; but should it be supposed that we may stand in need of assistance, foreigners will not let us have their grain without receiving high prices.

Barley, after having for some time been neglected, has suddenly excited attention; this has undoubtedly been caused by the fears which the continued rains gave rise to in regard to the possibility of the seed being indifferently got in. As yet hardly any barley has, we believe, been sown; and it is deemed probable that the breadth of land originally intended for this grain will not now be devoted to its growth, in consequence of the advanced period of the season, and the unfitness of the land for the reception of seed. The present price is therefore regarded as moderate; and maltsters, distillers, and others, who, in February, seemed little inclined to add to their stocks, have lately been buying the finer qualities freely: hence the value of this grain has risen in most parts of the kingdom to the extent of 1s. to 2s. per qr.

Other sorts of spring corn and pulse have not hitherto been affected by the wet weather, indeed prices of oats, beans, and peas have tended downwards, as well in the markets in the agricultural districts as at the large consuming towns. That the moderate rates at which these articles have for some time been offered, and the present want of activity in the demand, have in some measure been occasioned by an extensive use of Indian corn as a substitute for feeding purposes, is, we think, more than probable; and as it is nearly certain that the importation of the last-named article will again be to a considerable extent, we are not surprised at the falling off in the enquiry.

In recording the transactions which have taken place at Mark Lane during the month, we have no striking or particular change to notice in the general state of affairs; but there has been a gradual and increasing tone of confidence, which is not unlikely to be followed by more stirring incidents. That the London millers are generally short of stocks is certain, and any occurrence of a character calculated to give rise to an impression that they might at some future time experience more difficulty in obtaining an adequate supply than they have hitherto done might therefore cause a desire to purchase more extensively than they have yet shown a disposition to do, which would be sufficient to give an impetus to business. The quantity of home-grown wheat brought to the metropolitan market has been quite moderate, but in the absence of anything like excitement the supply has sufficed to satisfy the inquiry, the total advance during the month having amounted only to about 2s. per qr. Up to the 13th March quotations remained nearly stationary, but all that was brought forward was placed at fully former rates; the first indication of any advance was on the day named, when the best qualities realised about 1s. per qr. more than had previously been obtainable. Subsequently, the demand slightly increased, and a further improvement to the same extent was established on that day week. Since then the receipts have become rather more liberal, and the weather having undergone some improvement within the last few days, the upward movement has been checked: indeed, business was decidedly dull on the 27th, and the enhancement previously established was scarcely maintained.

Of foreign wheat the arrivals have been much less plentiful than was at one period expected would have been the case, scarcely 20,000 qrs. having come to hand since the close of February. Of this, only a portion has been cleared in for home consumption, several cargoes having been landed in bond for the chance of a fall in the duty at some future period. The greater proportion of the recent importations has been from the near continental ports, mostly the produce of last year, the quality good to fine; and such descriptions being much wanted, a steady sale has been experienced. Sellers have, however, been unable to induce the millers to pay higher prices, and with the exception of an advance of 1s. per qr. on the very finest sorts, little or no change has taken place in quotations since the commencement of the month.

In addition to the local demand, we have from time to time been visited by buyers from different parts of the country, who have taken qualities which our own millers have declined purchasing; a tolerable extent of business has therefore, on the whole, been done. Really fine high-mixed Danzig is no longer to be met with, but the best of that here has sold at from 54s. to 58s., and, in some cases, 60s. per qr. The inquiry has, however, been principally directed to good heavy qualities of red wheat, such as the finer sorts received from Hamburg, Antwerp, &c.; these descriptions have brought from 50s. up to 55s. per qr., duty paid, according to weight, condition, &c., and for Rostock 1s. to 2s. per qr. more has been paid. There has been very little doing in the inferior kinds from the Black Sea, &c., and not the slightest improvement has occurred in the value of stale granaried samples.

On the 1st March, when the suspended corn-laws again came into force, the aggregate average price of wheat was 51s. 5d., and the duty was consequently 6s. per qr., at which point it remained until the 9th inst., when it rose 1s., and from present appearances it seems likely to remain stationary at 7s. per qr. for some time to come.

The somewhat firm tone which the wheat trade has assumed, and the upward tendency of prices, have rendered the millers rather unwilling to enter into forward contracts to deliver flour; still no quotable rise has occurred in prices of that article. The bakers are, we believe, not much better provided with stock than the millers, and latterly a disposition has been manifested to purchase rather more extensively; the top price of town-made flour has, therefore, not only been supported, but in some cases rather exceeded. The inquiry for country flour has also been good, and prime Norfolk households have lately risen 1s. per sack. In American the transactions have not been important, which has, however, been as much caused by the smallness of the quantity remaining on hand as from a want of demand. The best brands have been held at 27s. to 27s. 6d. per barrel, and some parcels have found takers at from 23s. to 25s. per barrel. According to the most recent advices from the United States there appears little prospect of supplies reaching us from the other side of the Atlantic, the article being worth as much at New York as in London.

In the early part of the month barley was a good deal neglected; and though the receipts both coastwise and by land-carriage samples were very small, considerable difficulty was experienced in disposing of what came forward. The continuance of wet weather in the early part of the month, and the consequent impossibility to make progress with the sowing of this crop, subsequently gave an impetus to the demand, and on the 13th March the maltsters took off the best samples at prices 1s. per qr. above those previously current; the following week being again wet, a further rise of 1s. per qr. occurred on the 20th, and the advance then established has since been tolerably well maintained. Really good malting qualities, such as were not worth more than 32s. to 33s. in February, have lately commanded 34s. to 35s. per qr., and other sorts have sold at corresponding terms. The duty on this grain is at present, and has been throughout the month, 2s. 6d. per qr.; the late rise may perhaps have the effect of raising the average price, and reducing the duty a step or two. As yet we have had but trifling supplies from abroad, but we believe that some quantity is likely to be received from the Danish Islands, &c. There has not been much demand for grinding barley, and quotations have undergone little or no change.

Malt, after having for months sold very slowly, has lately met with a good deal of attention, and its value has risen at least 2s. per qr. from the lowest point of depression. There is just now very little talk about the repeal of the Malt Tax; the present time is certainly not favourable to press the subject on the attention of the legislature, still the matter ought not to be lost sight of.

The market has been well supplied with oats since our last monthly notice; and a large proportion of the supply has been of foreign growth. A slight increase has also taken place in the receipts from Ireland, and as an opinion prevails that the shipments from the sister isle and from some of the near continental ports will be pretty extensive, the dealers seem determined to hold off buying. The trade has, throughout the month, been exceedingly languid, great unwillingness having been shown to take more than absolutely necessary to provide for immediate wants. On the first Monday in March there was some appearance of a small rise taking place, but factors were not at any time enabled to obtain more money; on the 13th business had again become very dull, and on the 20th even the best qualities of oats were offered at a reduction of 6d. to 1s. per qr. Subsequently the dealers refused to purchase without a further concession, and on Monday last factors had again to take 6d. to 1s. per qr. less, where anxious to effect sales.

Beans of home growth have been exceedingly difficult of disposal, and though the quantity brought forward has not been by any means large, the value of the article has tended steadily downwards. New ticks have lately been offered at Mark Lane at 31s. to 33s. per qr., and other sorts at corresponding rates, without exciting attention, Egyptian Beans, with which we have been well supplied, were at one time sold as low as 26s. per qr., duty paid, but have since rallied 1s. to 2s. per qr.

The business in Peas has been quite unimportant; indeed, hardly anything has been done in the finer sorts, except for sowing, and for that purpose the inquiry has not been by any means active. Good foreign boiling peas have recently been sold at 34s. to 35s.; and the very finest English are scarcely worth 38s. to 40s. per qr. at present. The reduction on grey and maple has been in about the same proportion, and even at the decline named the demand has been languid.

Very little variation has occurred in the value of Indian corn during the month, and the transactions in the article have been on a strictly retail scale. Some of the inferior sorts might easily be bought now at 25s. to 26s.; but for really good qualities 30s. to 31s. per qr. continues to be demanded.

We have already, in a previous part of this

article, alluded to the very firm manner in which the prices of bread stuffs have been supported in the American markets. This we certainly did not expect, considering the generally acknowledged abundance of the yield of the crops in all parts of the United States and Canada.

The latest letters from New York are of the 8th inst. Flour was then worth 6 d. 31½ c. to 6d. 41¾ c. per brl.; rendering the price in English money, free on board, fully 27s. 6d. per brl. So long as these rates continue to be supported, there is, of course, no reason to calculate on supplies from the other side of the Atlantic; but that prices will, during the summer, accommodate themselves to the value of the article in the British markets, we have not the slightest doubt. In the north of Europe quotations are also just now too high to allow of consignments being made to England with a chance of deriving profit. Holders in the Baltic appear to consider, that in case of war breaking out, the value of provisions would be enhanced, and hence they have raised their pretensions. The most recently received accounts from Danzig inform us that inferior qualities of wheat were very scarce there, and that no export demand had been experienced, that the best high mixed samples had been held at 46s. to 48s., and good to secondary sorts at 45s. down to 38s. per qr., according to weight, condition, &c. From Rostock, Stettin, Griefswald, Stralsund, and other places from whence we generally draw our supplies of the best red wheat, the reports represent business as having remained very firm. The value of 61 to 63 lbs. wheat varied at those places from about 38s. to 40s. per qr. free on board. At Hamburg prices have fluctuated a few shillings per qr., but were not, according to the latest accounts, materially different to what they were last month, good Wahren being worth 42s., and fine 43s. to 43s. 6d. per qr. free on board. In the Dutch and Belgian markets hardly anything has been done, except for local consumption, and little or no change has occurred in the value of wheat, either at Amsterdam, Rotterdam, or Antwerp.

At all the markets in the south of Europe business has been completely paralyzed by the French revolution, and the disturbed state of Italy, Tuscany, &c; the advices from the Mediterranean ports have therefore ceased to be of the slightest interest in a business point of view.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter. NEW.		OLD.	
WHEAT, Essex and Kent, white	46 to 56		50 to 59	
Ditto red	44	52	46	55
Norfolk and Suffolk	45	48	—	—
Lincolnshire and Yorkshire	—	—	46	53
RYE	32	34	—	—
BARLEY .. Essex, Kent, Norfolk, and Suffolk .. com. Malting	32	33	—	—
Distillers' & Grinding	29	31	—	—
Chevalier	33	34	—	—
MALT .. Essex, Norfolk and Suffolk	—	—	55	57
Kingston, Ware, and town made	—	—	57	59
OATS .. Norfolk, Cambridgeshire, Lincolnshire, and Yorkshire, feed	—	—	17	20
Ditto, Poland and potato	—	—	21	23
Northumb., Berwick, & Scotch potato	—	—	23	26
Ditto, feed	—	—	21	23
Devon & West Country, feed or black	—	—	15	18
Dundalk, Newry, and Belfast, potato	—	—	21	22
BEANS .. Ticks	32	34	42	44
Harrow and small	35	38	44	54
PEAS .. Boiling	36	40	—	—
Hog and grey	33	38	—	—
FLOUR .. Town made (per sack of 280 lbs.)	—	—	41	46
Norfolk and Suffolk, household (do.)	—	—	35	38

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans. s.	d.	Peas. s.	d.
Feb. 12, 1848..	51	0	31	2	20	7	30	5	38	1	42	5
Feb. 19, 1848..	50	11	31	3	21	1	32	4	37	10	43	2
Feb. 26, 1848..	50	2	30	9	20	8	30	3	38	0	41	7
Mar. 4, 1848..	49	11	30	8	20	5	30	5	36	9	41	8
Mar. 11, 1848..	50	2	30	4	20	2	33	4	36	2	39	0
Mar. 18, 1848..	50	4	30	5	20	4	28	6	36	2	39	10
Aggregate Average of the six weeks which regulates duty	50	5	30	9	20	6	30	10	37	2	41	3
Comparative Average same time last year	78	6	49	11	31	2	56	1	51	8	53	7
DUTIES	7	0	2	6	2	6	2	6	2	6	2	6

PRICES OF SEEDS.

BRITISH SEEDS.

Cloverseed, red 33s. to 48s.; fine, 51s. to 52s.; white, 38s. to 48s.
Cow Grass ..... 36s. to 58s.
Linseed (per qr.).. sowing 56s. to 60s.; crushing 42s. to 48s.
Linseed Cakes (per 1,000 of 3 lbs. each) £12 10s. to £13 0s.
Trefoil (per cwt.) ..... 15s. to 21s.
Rapeseed, new (per last) ..... £30 to £34
Ditto Cake (per ton) ..... £5 15s. to £6
Mustard (per bushel) white .... 6s. to 9s.; brown, 8s. to 10s.
Canary (per qr.) ..... 68s. to 70s.; fine, 71s. to 72s.
Tares, Spring, per bush. ..... 5s. 6d. to 6s. 6d.

NOTICES TO CORRESPONDENTS.

"An Old Subscriber."—We could not give an opinion positively without a clearer statement of the facts; but it appears to us that if the money verbally agreed to be paid, was not paid, that an action would lie; but if it was tendered immediately, the damages would, in all probability, be nominal.

"Country Subscribers—Overseers."—You are not liable for the arrears due by your predecessors; they are bound within 14 days after other overseers are appointed to make out an account in writing of all monies received by them, and to sign such account, and within the next 10 days to pay over the balances to their successors, and upon neglecting so to do are liable to be committed to the common jail. The clerk to the guardians, or, if the parish be not in a union, the clerk to the justices, will advise you what course to pursue. We apprehend the churchwardens will not be liable unless they personally act as overseers. Where an assistant overseer has been appointed, we presume security would be taken; if not, we should be disposed to consider the overseers liable.

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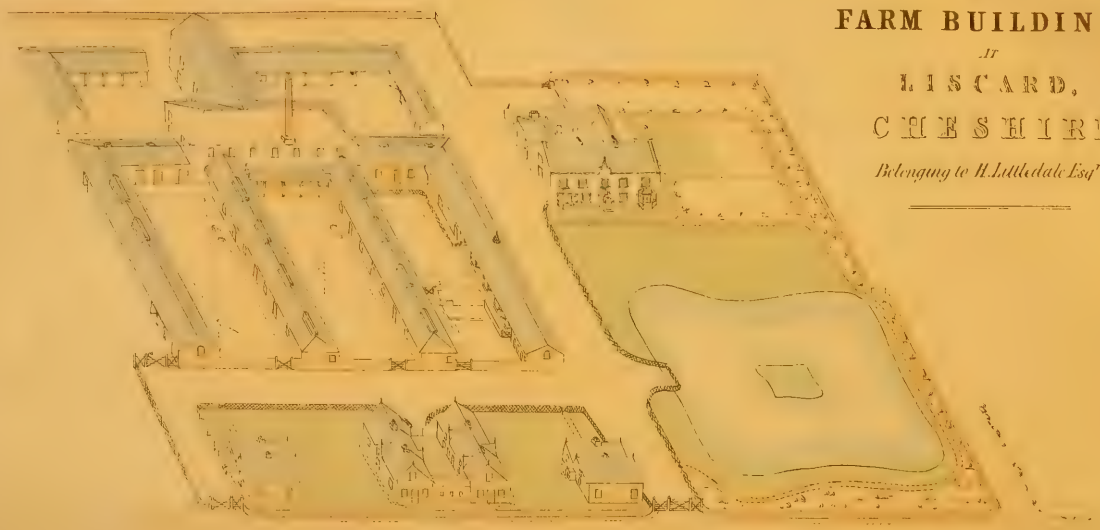
GENERAL VIEW
OF THE
FARM BUILDINGS,
AT
LISCARD,
CHESHIRE.

Belonging to H. Littledale Esq^r



GROUND PLAN
OF THE
FARM BUILDINGS,
AT
LISCARD,
CHESHIRE.

Belonging to H. Littledale Esq^r

REFERENCE TO FARM BUILDINGS

1. Principal Horse
2. Bull Barn
3. Stalls for Cows
4. Do Do Do
5. Do Do Do
6. Manure Tanks
7. Boar Styes
8. Mill Horse Stable
9. Pigs Yard
10. Pigeons
11. Ducks
12. Turkys Geese &c
13. Shed for Pigs
14. Do for Poultry
15. Poultry Yard
16. Potatoe Stores
17. Implement & Root Shed
18. Cart House
19. Cows Houses
20. Grains
21. Stirk House
22. Barn
23. Engine House
24. Boiler Do
25. Granary
26. Stable for 10 Horses
27. Old Chaff
28. Steaming House for Roots
29. Well
30. Smithy
31. Carpenters Shop
32. Churn House
33. Cart Shed
34. Drill House
35. Slaughter House
36. Stock Yard

REFERENCE A.

1. Parlor
2. Steps
3. Office
4. Living Room
5. Scullery
6. Passage
7. Nursing Room
8. Smoking Do
9. Privies
10. Ashes
11. Tubs &c
12. Oven & Boiler

REFERENCE B.

1. Living Room
2. Pantry & Stairs
3. Kitchen
4. Ashes
5. Coals

REFERENCE C.

1. Kitchen
2. Parlor
3. Scullery
4. Girls
5. Ashes

UPPER FLOOR OF BARN D.

1. Threshing Machine
2. Separator
3. Hay Pulleys
4. Linseed Crusher
5. Thrust Hole
6. Chaff Box
7. Tank

A. H. & Sons, Liverpool

THE FARMER'S MAGAZINE.

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PLATE

FARM BUILDINGS AT LISCARD, CHESHIRE.

THE PROPERTY OF HAROLD LITTLEDALE, ESQ.

FARM BUILDINGS AT LISCARD, CHESHIRE,

THE PROPERTY OF HAROLD LITTLEDALE, ESQ.

We were highly gratified a short time since by an inspection of the new and extensive farm buildings of Harold Littledale, Esq., at Liscard, Cheshire. They are pleasantly situated on gently elevated ground, on the north side of the road leading from Liscard to Poulton-cum-Seacombe, about a mile from the Mersey (by Egremont), and cover about four statute acres, which include the buildings, farm-yards, stack-yard, manager's house and garden, cottages, shrubberies, &c. The premises are rendered conspicuous by a tall chimney, steam power being used in all the operations for which it can be made available. Although, however, the buildings, with their enclosed yards, cover a large area, when the numerous uses to which they are applied and the amount of business carried on are taken into account, the whole establishment, with its modern improvements and adaptations, may be pronounced to be the most compact, and perhaps the most convenient and appropriate, of any to be found in the United Kingdom.

On entering the gateway, the visitor is struck by the neatness, order, and regularity of all around. The buildings are of substantial brick-work, faced with stone and slated. There are eight two-story cottages for the work-people, with neat shrubberies around them near the road, resembling little villas. Four of those cottages are very complete ones. Further eastward stands the bailiff's house—a handsome building in the Elizabethean style, with a porch. At one end there is a good kitchen and flower garden, and in front (southward) green sward and shrubberies, sloping down to a pond, with a little island in the middle. The site of this pond was formerly a rough marl pit, which was enlarged, from the clay of which about a million of bricks were made for erecting the buildings, having been dug out of it. The premises are sheltered on the north side by a thriving belt of trees.

The whole of the buildings were designed and planned by Mr. Torr, of Riby, Lincolnshire, and were built by Messrs. Samuel and James Holme, of Liverpool, they are plain in structure and generally one story in height. The roofs throughout are of wood, and tension rods, forming a strong arch against outward pressure or expansion, supply the place of the heavy principal beams formerly used.

Mr. Littledale occupies about 350 acres of excellent land, in Liscard and the adjoining township of Wallasey, the whole of which he has, by skill, capital, and unremitting industry, brought to a state of cultivation and productiveness far surpassing what was before known in that district. He grows a considerable quantity of wheat and other grain, but directs his attention more especially to the dairy, keeping a great number of cows (generally about 80), all of which are stall-fed; the greater part of the farm is consequently devoted to raising artificial grasses, turnips, mangel wurzel, &c., for their use. The quantity of milk and butter produced is very great, and of the best quality; and for which, from

the proximity to Liverpool, a ready market is found. Many pigs are also reared and fatted.

Entering at the east side of the group of buildings, there is a ten-stall stable for farm horses. The stalls are erected in the most approved modern manner, and fitted with iron mangers of a peculiar form, no racks are used, the fodder being cut into chaff; the ventilation is admirable, and the interior of the walls whitened. Opposite to this stable there is a harness-house, and, near by, a four-stall stable, for the Shandry horses that take out the milk to the customers in the neighbourhood. The working horses are kept in the stable, all the year round, with the most perfect health: gypsum is abundantly used in all the stables, shippons, &c.

The piggery comes next in order; the arrangements of which are so complete and cleanly as to completely refute the notion generally entertained, as to pigs being of naturally filthy habits, and requiring to wallow in mire. There are eight large pig-sties, under a lofty shed, open at one side. The poultry houses are immediately over the sleeping places of the pigs, and so arranged that the poultry derive warmth from the natural heat of the pigs, which ascends to the houses above them. Torr's registered iron pig-troughs are used, with iron doors hung horizontally from the top. These swing over the trough, and may be readily adjusted so as to accommodate the larger porkers within the sty, or the smaller outside ones: the latter eating up clean what is left in the troughs by the former, thereby preventing waste. The small pigs are allowed to range in the yard or quadrangle, amongst the refuse from the mangers and litter of different kinds, out of which they obtain clean and wholesome pickings, and on which they sport and play, or bask in the sun, or can retire to a comfortable shed provided for them. There is a separate place for mixing and preparing the food. They all look clean, healthy, and thriving. The number may be estimated from the fact that from 40 to 50 large bacon hogs were killed last year.

There are a number of separate large hen-roosts for fattening, above the pig-sties; also rooms for fattening geese, chickens, and ducks, all under the roof; and in the roof there is an ornamental, well-stocked, pigeon-cote.

Over a lobby or passage in the quadrangle there is an immense water-tank. It is filled by the steam-engine, from the pond before alluded to, and contains 10,000 gallons. This tank supplies the engine-boiler and the whole of the premises, by hydraulic pressure, through pipes laid in various directions, thereby saving much labour. In the centre of the yard there is a small tank filled from it, to nearly the level of the ground, for the use of the young ducks and chickens.

The shippons, or cow-houses, are particularly deserving of notice, both from their size and structure. Two of them contain 32 cows each, and one of them 16, or 80 in all. The stalls are wide, and are formed or partitioned with huge blue Welsh flags or slates, each division being of only two stones placed perpendicularly, and forming a graceful ogee at the top. These slates are so secured with iron rods, and the iron mangers connecting them together, that they are as strong as if they were of iron, which, from their dark polished surface, they much resemble. The cows are all fastened, two in each stall, in a manner that gives them freedom to stand or lie, or to turn on their sides; but this is the extent of their liberty; for there they always remain, never being turned out either for air or exercise. They are fed with the best of fodder—Italian ray-grass chiefly in summer, and cut hay and straw steamed, turnips, mangels, &c., in the winter. The boiling-house is conveniently near, and the boiling is accomplished in a superior manner by steam, which is introduced into the boilers from the steam-engine boiler. Linseed is also boiled for the cows, and a large quantity of grains likewise consumed. There is a passage or lobby running along each of the shippons, between the heads of the animals and the wall which they face, taken off by Yorkshire stone flags, and which facilitates feeding and attending them. These houses are kept remarkably clean; and being whitewashed within and well lighted have a very cheerful appearance. They (as well as the stables, &c.) are drained into a large tank in the yard, which supplies liquid manure for the grass fields. The floors are neatly laid with square Welsh tiles, the open gutter at the heels of the cows is on a capital form, and stink traps are provided to prevent any effluvia escaping from the drains below. The cows are chiefly of the short-horned breed, or a cross between that and the Yorkshire. Some of the stalls are eight feet wide, and others seven feet. The cows, without an exception, are beautifully sleek and clean, and in prime condition; their skins being constantly brushed and combed; their health not being affected in any degree by their confinement. As a proof of this Mr. L. has not had a single case of the fatal epidemics which have been so prevalent in the immediate neighbourhood. This may be accounted for by the regularity with which they are fed, and the attention paid to ventilation. The same temperature is, as nearly as possible, maintained, being regulated by the thermometer. The cows are watered by pails, for the sake of cleanliness; and, having plenty of roots, they require very little. There is a separate house cleverly fitted up for calves, an hospital for sick cows or calves, and a bull-house.

We ought to observe that there is no peculiarity

in these buildings, from their being used at present for a dairy, as the sheds are equally well adapted for feeding bullocks.

There is a room for steaming hay, in which a ton or more can be steamed at a time. The cutting machine is over it, and feeds the material down through the floor. There are a great number of buildings devoted to various purposes—as a washing house for roots, a straw and chaff house, a tool house, extensive cart sheds, a compost shed for the preparation of artificial manures and the preparing of guano; houses partly under ground (with cased walls filled in with charcoal as a non-conductor, and air vents that may be plugged up during frost) for the storing and preserving of potatoes* or of turnips; a slaughter-house; a curing or salting room for bacon and hams—where we noticed some very simple and practically useful shelves made of broad slates (to salt the bacon on), with grooves cut in them to carry the brine off into the pickling tubs underneath—a room for smoke-drying the same; a blacksmith's and a carpenter's shop; an implement house, and a churning house. In the last we saw at work a cylindrical-coopered churn, with a vertical shaft, turned with great rapidity by steam-power. The internal plan of this rotary churn is simple, yet effective. It will churn 80 gallons of cream at once, and the butter is made in a very short space of time. On one occasion, as a trial, butter was perfectly obtained in ten seconds less than nine minutes, to the utter astonishment of several of the Cheshire dairy-women who were present.

The steam-engine is of ten-horse power, and is a beautiful piece of machinery. Near it there is, on the ground floor, a winnowing-machine (Clyburn's patent), immediately over which, on the second floor, is a remarkably compact thrashing machine, without rollers, on the patented principle of Parsons and Clyburn; also a corn separater by Clyburn, this is found an essentially useful machine. In the same story† is the granary, a large and commodious room.

There is a drying-kiln, laid with perforated tiles, heated by a range of six steam-pipes under them the heat being derived from the steam-engine boiler. There are two superior chaff-cutting machines, one from Lord Ducie's works, and one from Mr. Cornes, both well-known as prize instruments at the exhibitions of the Royal Agricultural Society of England. There is also one of the corn and linseed crushers from the Uley iron works, of a large size, a most effective machine, and by which all the corn is crushed before it is given to the horses. All the various machines are driven by straps, or belts, from shaftings most admirably arranged, along and under the beams of the building. Amongst the many implements, we noticed many of the most improved of the present day.

The MANAGER'S HOUSE is on an extremely convenient and comprehensive plan, and the DAIRY adjoining is the most perfect and beautiful we have ever seen. It is a large oblong-square room, elegantly and usefully fitted up. The floor is formed of Kean's patent cement, of a chocolate colour, and was laid in one piece; but, by white lines of composition introduced, let into grooves made on the surface, it resembles fine pavement in large squares. There are two large tables, one on each side, made of sycamore, with turned pillar legs of the same; and the whole of almost snowy whiteness, from washing. There is a massive marble table at the farther end. Three very large octagonal-shaped leaden milk coolers stand in the centre, each on an ornamental pedestal. The walls above the tables, to the height of about 20 inches, are lined with glazed Staffordshire tiles, resembling small squares of veined marble. There are ten square ventilators round the sides. The roof is of the pavilion or caved form, groined, with a handsome foliated centre-piece, which, being in open work, leads the air to a large ventilator at the top of the building. The walls more exposed to the sun are built with a hollow space of three inches in them, through which a current of air passes, and there is a double ceiling, for the same obvious purpose of keeping an equal temperature in summer and winter. The milk dishes are all of glass, of various sizes, and both round an oval. These (glass being a non-conductor) are, for the preservation of the milk and for throwing up the cream, found to be superior to vessels of the usual materials. The room is, in fine, a perfect model of a dairy in elegance, cleanliness, and adaptation. The milk-kits, or pails in which the milk is brought from the shippons, are all beautifully made of sycamore, and are kept so clean that the wood, like the tables, is white and spotless, and the iron hoops of dazzling brightness. Close to the dairy, and under the roof

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* It has been found that the potatoes keep excellently in these houses.

† In the granary has been placed a flour mill, with two pairs of French burr-stones. The flour, when it descends from the stones into a receiver in the lower story, is carried up to the higher one by what are called elevators—little tin buckets fixed on an endless belt, and working on the principle of a harbour dredging-machine. There is a cooling room for the flour after it passes through the mill. Although useful, we do not consider the mill as strictly forming a part of the farming establishment.

of the manager's house, there is a handsome and well-furnished sitting or refreshment room for the use of the proprietor of the farm, whose own mansion is at some little distance, near Egremont Church. The whole of this establishment is managed, *within doors*, by four women servants, besides the active female housekeeper, who has had great experience in domestic farm arrangements, and three men servants—sometimes four. A great number of men, and in summer frequently women also, are besides employed in field and garden operations—many more, indeed, than before the land fell into the hands of Mr. Littledale.

Near the entrance gate is a weighing machine, with an indicator in the adjoining cottage, by which loads of hay, roots, &c., can be weighed, as well as the live weight of cattle accurately ascertained. The whole of the buildings are most efficiently spouted, and the water is carefully carried to the large pond before alluded to, by drains, independent of those for the liquid manure tanks.

We have already adverted to the admirable cultivation of the farm throughout. The improvement of which not only affects the fields within its boundaries; but, by having excited a spirit of competition for profit or in self-defence, the neighbouring farmers, who for years went on at the old jog-trot, and abhorred innovations, are many of them following in the same track, so far as their means and the nature of their tenures will permit.

Italian ray-grass is most successfully grown. Three heavy crops, and sometimes four, are obtained in one year; the first frequently in April, some of it averaging four feet high. North of the farm-building, we saw turnips and mangels of great size. Of the general crops, in addition to what had been consumed during the season by the cattle, some estimate may be formed by the fact that in the stack-yard there was one stack of new hay, 40 yards long by 5 in width; another 20 yards long; an old stack 25 yards long; and five long huge stacks of corn. To facilitate the carriage of the turnips, &c., off the land, a moveable wooden railway, made in long lengths, and united with dowels, is used, especially in wet weather when carts cannot be conveniently employed. Upon this, waggons carrying each a ton and a half, are easily moved by hand.

The celebrity of these Farm Buildings has attracted, and is daily attracting, an immense number of visitors from all parts of the kingdom. A short time since Sir Robert Peel honoured the proprietor with a visit, and was highly delighted with what he saw, declaring that "it was the most complete thing he had ever seen." Great credit is due to the intelligent Bailiff, Mr. Teasdale, for the perfect state in which every thing connected with the establishment is kept, as well as the state of the farm generally.

We need but add that the highest commendation of the public at large is due to the spirited owner, who has not only shown an example to farmers worthy of imitation, by producing a greater quantity of food from a given area of land than was done before; but who, being a merchant, has proved that the active pursuits of commerce and agriculture may be harmoniously and advantageously combined for the general good, as well as the advancement of individual interests.

We cannot conclude this article without expressing our conviction that not only the proprietor, Mr. Littledale, but the owners of landed estates generally, are greatly indebted to Mr. Wm. Torr, for having produced such an excellent model for a farm-stead as may here be seen—solid, neat, convenient, yet free from that greatest of all objections, extravagant expenditure. These premises really form a model, which the improving proprietor, about to expend money in buildings upon his estate, may safely adopt.

A well-arranged, economical plan for farm premises has long been a desideratum. Many have been put forward by persons who thought it only necessary to be able to draw a pretty-looking plan upon paper. In this case, however, Mr. Torr unites, with the ability to design, that practical experience which enables him to vouch for the usefulness of the construction and arrangement of every department of the premises.

TREATISE

SHOWING WHERE ANY CROP MAY BE BENEFICIALLY INTRODUCED BETWEEN CROPS NOW COMMONLY CULTIVATED, EITHER AS FOOD FOR ANIMALS ON THE LAND, OR ON LANDS INCAPABLE OF SUSTAINING ANIMALS, BY PLOUGHING IN OR OTHERWISE, TO ASCERTAIN IF AN ADDITION CAN BE MADE TO THE EXISTING PRODUCE OF ARABLE LAND AT TIMES WHEN IT WOULD OTHERWISE BE BARREN OR UNPRODUCTIVE.

Subject proposed by the Bath and West of England Society.

It is acknowledged that the chief object of the agriculturist is to obtain from the soil the greatest amount of marketable produce with the least expenditure; not that the farmer should endeavour to spend upon the land as little as possible, but with increased outlay he must, of course, be recompensed by an increased produce: thus if by an outlay of £5 per acre he gets 10 per cent. interest, and by laying out £4 or £5 more per acre in improved cultivation he finds that he has an interest of 10 per cent., it must be to the farmer's advantage to spend his surplus capital in the superior cultivation of land, rather than holding a greater quantity upon which he is unable to employ a sufficient capital: it will not only be to the farmer's advantage that the acreable production of a farm is augmented, but it will have an effect on the condition of the entire population.

That the subject of this essay will be one way of obtaining a greater produce from a given tract of arable land, there cannot in most cases admit of a doubt; but in order to give the system a fair trial, there must be high and clean cultivation; no bare fallows must be required for the destruction of weeds and the pulverization of the soil. But in place of the bare fallow of the heavy land, we may cultivate root crops in drills, so far apart that they will admit, during dry weather, the constant use of the plough or horse-hoe between the intervals. In this manner a crop of roots may be obtained with as much benefit to the soil as would be acquired by the unproductive fallow; indeed, bare fallows are perhaps only required on the very stiff clay soils, and even on these retentive soils they may in very many cases be done without, by the assistance of thorough draining. On the light and sandy soils of Norfolk and Suffolk the rotation almost universally adopted is that of the common four-course or Norfolk system of cropping—1st, turnips; 2nd, barley; 3rd, clover and other seeds; 4th, wheat. Under this system the only period of time of any great length, during which the land is bare or in an unproductive state, is that interval which occurs between the harvesting the wheat crop, and the sowing of the succeeding crop of roots; now the greater part of this period is one in which vegetation is at a standstill; and therefore it may be said it would be folly to expect to reap the benefit of a crop within so short and unfavourable a period: and another reason that is alleged against it is, that the land, after the wheat crop, requires cleaning. However, the flockmasters of Norfolk and Suffolk, in order to keep up a regular supply of food for their sheep, have adopted the practice of growing rye for feeding off early in the spring with ewes and lambs. This not only secures an additional crop, but supplies food at a time when it is most wanted. Of this crop the author of the *Report on the Farming of Suffolk* in the *Journal of the Royal Agricultural Society*, says:—"The cleanest wheat stubble is generally selected for this crop, though on some farms the practice is to take rye for feeding alternately on the several fields of the shift. One ploughing is given, and the seed drilled at the rate of from three to four bushels per acre: the amount of seed may appear great; but it is generally considered that rye for feeding cannot be sown too thickly. A few tares are sometimes drilled with the rye: this thickens the bottom of the feed. Within the last few years an early variety has been introduced for the purpose of feeding off in the spring. It is called the giant or Tyrolese rye, and it has the great advantage of coming a week or ten days earlier than the common rye, though some farmers do not consider the produce equal, or the feed to last so long as the common variety. The time of feeding off the rye is determined by the severity of the winter, and by the time at which the turnip crop is consumed. The usual time of turning in ewes and lambs is from the middle to the latter end of April; for feeding with sheep the rye should not be allowed to get too forward, or the sheep will not eat it readily. The sheep are usually folded in hurdles on the rye, a fresh piece being given them every day; the hurdles are set in such a manner that the lambs can get through them and feed on the fresh rye at the head of the fold. When from an abundant crop of turnips they remain unconsumed till late in the spring, causing damage to the soil by

running to seed, and putting a stop to the barley sowing, it is good policy to cart some of the last turnips from the field on which they grew, and lay in a heap on one side of the rye-field. These may be given to the sheep feeding on rye. The best way is to cut the roots with a machine, and give them to the sheep in troughs; but when this cannot be done, they may be thrown out on the land. The cost of carting the roots will be amply repaid by the convenience of being able to proceed in the sowing of barley at a seasonable time. The change of the sheep from turnips to rye will also be more gradual. Green rye in a forward state may be mown for horses and cattle; and if cut into chaff with a mixture of straw, it will be useful as affording the first gradual change from the dry food of winter to the green of summer." Rye, from its luxuriant growth on dry, gravelly, and sandy soils, which are not rich enough for the production, in any bulk, of the usual crops grown for the purpose of feeding off or soiling, must be one of those crops that can be beneficially cultivated on such soils. As soon as the rye is fed down close, the land is ploughed two or three times, and with harrowings and rollings it is brought into a pulverized state for the sowing or drilling of white turnips by the latter end of June or beginning of July. That there exists a necessity of ploughing rye land two or three times, is much to be questioned, and can only be required when farm-yard manure is used; but this is seldom applied on land intended for turnips after rye has been folded. If we imagine that several ploughings are requisite for the bringing a light soil into fine tilth, we may let slip the best opportunity for sowing turnips during showery weather. That early is better than late sowing must be allowed, because if the first sowing fails we have time for another chance of a plant. On land suited to their growth, swedes may be grown after rye, if it receives but a single ploughing. That swedes and white turnips may be grown with success on land pulverized and cultivated after a single ploughing, may be proved by the practice being adopted by one who has the reputation of being a first-rate practical farmer.

It may be asked what are the disadvantages of frequent ploughing a light sandy soil at this period of the year? Independent of the expense, and of the loss sustained by allowing the land to lie barren during a time when vegetation advances rapidly, the other objections are that during dry weather the frequent stirring and consequent drying of the soil will certainly tend to reduce one of the elements of fertility—the organic portion of the soil; while by a single ploughing, the stalk and roots of the rye will be covered by the soil, and after a time these will decay, and by that means increase the organic portion of the soil. Now this would not be the case to nearly the like extent if the stalks and roots of the rye, with the droppings of the sheep, were brought to the surface and dried by the action of the sun and wind.

Italian rye-grass, as well as trefoil, may be sown with the wheat crop, for the purpose of early spring feed; the land may then be ploughed up for roots. As the seed may be sown and harrowed in, there will be no extra expense incurred by ploughing or tillage. These plants afford the largest amount of produce in the spring, and they will be of greater service to the stock farmer either as early feed for sheep, or for the purpose of soiling. The Italian rye-grass sown on a wheat stubble will, on rich and moist land—unsuitable for feeding—produce an abundance of early grass, that may be mown some time sooner than perhaps any other known variety.

On the better description of light soils, and on all rich and heavy lands, tares or vetches may be grown in the interval that occurs between corn and root crop. Tares are not only useful for soiling horses and cattle, but are frequently given to sheep in hurdles, or thrown out on pasture land. The time of sowing may be as soon after harvest as possible; from two to three bushels of seed per acre is generally used. If a coat of manure is given, this crop and the following one will feel the benefit, and the latter will not have to wait for the application of the manure at a time when vegetation makes the most rapid progress. Many heavy land farmers grow tares for mowing, and allow their land to remain fallow till the time of barley or wheat sowing. There is generally ample time for the growth of another green crop. If the land is dry, and the tares off early, turnips may be sown; or on newly broken or peaty land, rape or mustard may be taken with a view of feeding off with sheep. Tares should always be fed or mown in narrow strips right across the field, as by that means the land may be ploughed and sown in small portions of a stetch or so at a time, before the soil becomes hard and dry. A good crop of tares is perhaps as good a preparation for the following green crop as there can be. The soil being kept shaded, ploughs up in a moist, rich, and friable state.

Swede turnips or cabbages transplanted on the land, after tares have been mown or fed, will be an equal, and on some descriptions of soil will be a superior crop to either white turnips or rape. Where this cultivation is adopted, as great a depth of mould is obtained as possible by ploughing, harrowing, &c.: the land is then drawn out into 27-inch ridges: manure is spread in the furrows at the rate of 14 loads per acre, and covered in by splitting the ridges with a double-breasted plough; the ridges are now rolled down flat, and remain till

showery weather comes for transplanting. A few drills of an early field of swedes are left without being singled out; and at the time of transplanting, the swedes are singled by the hand, leaving plants at regular intervals, whilst those pulled up are reserved for planting on the tare land. In this manner the singling of one field supplies swedes for transplanting on another. The extra expence will be made up by the saving of seed, of drilling, and of hoeing, besides having a much forwarder crop; it must be borne in mind that the swedes being transplanted at regular intervals will not require singling or hoeing out. Skirving's Liverpool swede has been transplanted in this manner for several years. There is often a difficulty of securing a plant of swedes on a heavy soil—perhaps this system may assist in removing that difficulty. The swedes may be carted or fed off in time for wheat, or, at latest, barley. Cabbages are cultivated in much the same manner: their produce affords one of the best descriptions of food for ewes and lambs.

The late patron of agriculture, "Arthur Young," in one of his valuable works, mentions the following practice, which he recommends as worthy of notice:—"They have on the South Downs an admirable practice in their course of crops, which cannot be too much commended—that of substituting a double crop of tares instead of a fallow, for wheat. They sow forward winter tares, which are fed off late in the spring with ewes and lambs; they then plough and sow summer tares and rape, 2½ bushels of tares, and half a gallon of rape; and this they feed off with their lambs in time to plough once for wheat. The land in the fallow year is thus made to support the utmost possible quantity of sheep its destination admits; the two ploughings are given at the best seasons; in autumn, for the frost to mellow the land and prepare it for a successive growth of weeds, and late in spring to turn them down. Between the times of giving these stirrings, the land is covered by crops. The quantity of live stock supported yields amply in manure. The treading the soil receives previous to sowing wheat gives an adhesion grateful to that plant. In a word, many views are answered, and a new variation from the wretched business of summer fallowing discovered, which by judicious application would be attended in great parts of this kingdom with most happy consequences to the farmers." The views of the celebrated Arthur Young on this subject did not appear to have much influence on the farmers of that time, though doubtless they will be looked upon with less prejudice by those of the present day, many of whom have laid aside the old-fashioned practice of summer-fallowing. That fallows are necessary we will readily allow; but they are only needful when the farmer wants the will or the ability of spending a sufficient sum per acre in draining, the destruction of weeds, and the other et ceteras of good farming.

The early stubble turnip may be grown after wheat or peas on light soils; the turnips do not grow to a large size, but they are valuable in the spring. The practice of mowing wheat lends a helping hand to the system of sowing a green crop directly after harvest on the wheat stubble, as the land may be ploughed directly the corn is carted. In the immediate neighbourhood of London they appear to exercise still greater despatch. I have seen the greater portion of a field ploughed whilst the corn is yet in the field, a slip of land being left wide enough for the passage of the waggon when the shocks are being carried. This plan cannot be universally recommended, as it interferes with the old custom of gleaning; and during this busy time the scarcity and high wages of labourers will not admit of their being employed about other than harvest work. However, when wet weather overtakes our harvest operations, the ploughing up a portion of the stubble with the intention of sowing turnips, or any other green crop, while the corn is yet in the field, will be good employment for our horses and men, when they cannot be more profitably engaged; it will certainly be the means of turning the rain which injures one crop to the benefit of another. On most retentive and adhesive soils the advantages of a summer fallow are considered to outweigh the benefits that will accrue from the cultivation of green crops. There must indeed be an extraordinary fertilizing effect in a bare fallow to make the practice more profitable to the farmer than can be derived from the greater quantity of beef and mutton produced, and the amount of the valuable manure applied to the land—the necessary consequence of the growth of green crops. Whether the fallow is made for wheat or for barley, the occurrence of one year in every three, four, or five years, during which the farmer does not receive a farthing from the land, but is, on the contrary, making a large outlay upon it, shows that the system is unprofitable.

The clay land farmer will allege that injury is done to the land in feeding roots on the land, and in carting them off; and in wet weather the injury to the soil by trampling will exceed the value of the crop. The feeding root crops on heavy land with sheep cannot be recommended; but the stall or yard feeding of cattle, on roots carted from heavy land, is practised with less detriment to the soil.

The generality of soils on which the system of feeding with sheep is injurious are found to grow heavier crops of tares, beet, swedes, and cabbages, than those soils devoted more especially to the

cultivation of roots. There is undoubtedly a greater difficulty in bringing the soil to a fine tilth for the reception of the seed; but by early ploughing, the frosts of winter may be made to assist in pulverizing the soil. There is also an invaluable implement in the shape of Crosskill's clod-crusher, which during dry weather will be of infinite service for the same purpose of pulverization; and, as before stated, the difficulty of obtaining a plant of swedes may be overcome by transplanting, which also allows either a previous crop of tares, or a greater length of time for the preparation of the soil.

Taking it for granted that a good plant and a good crop of beet or swedes have been obtained, the great objection to the cultivation of roots by the injury done to the adhesive soils in the removal of the crop has yet to be overcome. There are seasons of peculiar dryness, in which the carting roots from heavy land, with the intention of storing them away for the use of yard-fed cattle, may be done without injury; but as the seasons are not always propitious, we must adopt means for the prevention of the mischief. The removal of beet from the soil entirely by manual labour has been practised on fields of from 10 to 12 acres, to heaps made at the sides of the field, at a cost of 10s. or 11s. per acre for pulling, cutting off the tops, and barrowing or carrying the roots in skeps (wicker-baskets) to the side of the field. The rate of day-wages was 9s. per week for a man. The pulling the roots and cutting off the leaves were done by women and children. That this is a feasible practice, that entirely prevents the injury done by the horses and loaded carts, will hardly admit of a doubt. The expense does not greatly exceed that incurred by the use of horses, while it has for its recommendation the increased employment of the labourer. Should this practice not be adopted, beet or swedes may be pulled while the land is in a wet state, and laid in small heaps, and then covered with the leaves that have been previously cut off. In this manner the roots will receive no damage till dry or frosty weather enables them to be carted off the land. Another method of preventing injury by carting on wet land is to adapt the width of the ridges or stetches to the width covered by the wheels of the carts. If the cart covers two ridges the horse will walk in the furrow between them. If the cart wheels cover a narrow land or stetch, the shafts of the cart may be adjusted so that the horse walks in the furrow, one of the wheels following in his track.

Both beet and swedes on heavy land ought to be carted off the land—the first in October; the latter, if possible, in November or in December at latest. As fallow in some parts of the country is the preparation for wheat, there will not be time for this crop, though there is ample time for the ploughing for barley or oats. Here the rotation on heavy land is—1, fallow, or beet, swedes, and tares; 2, barley; 3, seeds on half the shift—the other half peas and beans; 4, wheat. If roots were grown on the whole amount of land of the first course, we could not complain of land lying in an unproductive state.

The cultivation of tares on heavy soils has been mentioned as one of the most important fallow crops. To succeed this crop white mustard might be grown with the intention of ploughing in as a dressing for wheat or barley. It has been much recommended for this purpose, though I have never been able to observe the advantage, as here it is grown only on new and peaty land, with the view of feeding off with sheep. In this country, at least, the ploughing-in green crops will never be carried to a much greater extent than the ploughing-in of the leaves of beet, with perhaps an occasional crop of rape or mustard. It will generally be more profitable to convert the crop into beef or mutton, and the manure made from the consumption will be more fertilizing in its effects than if the entire crop was ploughed into the soil.

The practice of ploughing-in green crops was employed by the Romans to fertilize their lands; and in Italy it is still prevalent. The crops ploughed in are usually leguminous plants, such as tares, buck-wheat, peas, lupines, with rape and mustard. In this country, when a large amount of green vegetable matter is ploughed into the land, it seldom undergoes a proper fermentation, without which it will not act as a manure, though it may have a mechanical effect in keeping the soil loose. As air, heat, and moisture are essentially necessary for fermentation in vegetable substances, it will follow that green crops will be productive of most benefit when ploughed in during warm moist weather, and consequently the practice will answer better in a warm climate like that of Italy, than it will in England. The time at which vegetables are best turned into the soil is when first coming into bloom, as there then will be the greatest bulk with the least injury to the soil by the growth of the plant.

Among the new systems of the present day, we have that of Mr. H. Davis, of Spring Farm, Croydon, to whom credit is due for bringing into notice his method of growing two crops at once, namely, beans and turnips: he thus secures a crop of turnips for feeding off in September and October. The land is then ploughed for wheat. Mr. Davis's system is far from being a modern one, though its want of novelty does not in any way detract from its merits, for by adopting his system of management and course of cropping, we shall find that

very little addition can be made to the produce of arable land with the present knowledge of the science of agriculture. As to the advantage of thin sowing, so highly spoken of by Mr. Davis, we must leave others to consider, as it is in no way connected with the present subject.

Of the other systems of double cropping, we may mention the common practice frequently seen in cottager's gardens, of growing beans and potatoes on the same plot of ground, which might perhaps be extended to field culture. An early crop of potatoes may be grown, and then succeeded by another crop. When the first crop are not taken up till they arrive at maturity, a good second crop may be secured in the following manner. The distance at which the crop is planted is the usual one of two feet. As soon as the earthing up the crop is completed, another crop of potatoes may be planted in the intervals. These will then have ample time to grow; and when the first crop of early and short haulmed potatoes are taken up, the second crop may have the moulds ploughed or stirred between the rows.

Our treatise—if it is worthy of such a name—is now brought to a close. It has not, I am sorry to say, thrown any new light on this very important subject; for it has rather been the view of the writer to point out the practical operations by which a green crop may be beneficially introduced between crops commonly cultivated, than it has to prove that an addition can be made to the existing produce of arable land. However, sufficient has been said to show that, independent of the increased produce of beef and mutton, that green crops introduced in the intervals that occur between crops commonly cultivated will have a beneficial effect on the fertility of the soil by the application of the manure produced by their consumption.

THE EMPLOYMENT OF THE NATIVE PHOSPHATE OF LIME AS A FERTILIZER.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

It must always be regarded as the highest reward which the author of any public suggestion can receive, to find it serviceable to his fellow-countrymen. When about the year 1825 I was advocating the use of crushed bones as a manure, I had occasion to remark that "there is another source from whence the phosphate of lime might be obtained in large quantities for the use of the farmer, viz., the fossil bone or native phosphate of lime, which is found in various districts of England in very considerable quantities, and only requires crushing or powdering to render it nearly as useful to the farmer as the recent bones. That the cartilage or oily matter of the bone does not constitute the chief fertilizing ingredient of the manure, is shown by the fact that the farmers of Cheshire and Lancashire, who use bone-dust, will as readily employ that which has first been used, and all its fatty portion extracted by the preparer of cart-grease and size for the calico printer, as they will the unused fresh bones. The mineral substance called the apatite, found in the Cornish tin mines, is entirely composed of phosphate of lime; 100 parts containing

Phosphoric acid	45
Lime	55

The native phosphate of lime is also found in many other portions of England, in Hungary, and in immense beds in Spanish Estremadura." These great Spanish beds of the native phosphate of lime years afterwards engaged the attention of the Royal Agricultural Society of England; and from thence came, as I have in another place had occasion to remark (Bell's Messenger, No. 2691), the researches and travels of Professor Daubeny and Captain Widdrington into Estremadura; thence arose some of the very successful and more recent searches and discoveries in our own country, to which I shall presently allude. The great native phosphorite rocks of Spain are described by these gentlemen (Jour. R. A. S., vol. v., p. 409) as situated at a short distance from Logrosan, a considerable village, about seven Spanish leagues to the south-east of Truxillo. It is in the clay-slate formation, which around Logrosan seems remarkably compact, that the deposit occurs.

"It may here be traced," they remark, "either along the surface or immediately underneath the soil for a distance of nearly two miles, and in a direction from NNE. to SSW.; so that, if we may depend upon our own observations on this point, it runs conformably to what appears to be the direction of the rocks themselves about Logrosan. Granting this to be the case, its position would lead us to regard it as interstratified with clay-slate; and we shall therefore venture in the remaining part of this memoir thus to consider it, although aware that it has been spoken of by Le Play as intersecting the

formation, and that the general direction assigned to the rocks of the country by that geologist is not in accordance with what appeared to us to belong to those immediately around Logrosan. At its south-western extremity it seems to terminate not far from the base of the granite hill before noticed, but a little to the east of it. This hill, indeed, on the side nearest to the phosphorite, consists of clay-slate, apparently heaved up by the granite, which constitutes its summit, as well as its north-eastern declivity; but the deposit in question has no connexion with the latter rock, as was reported to us at Madrid to be the case. At this, its south-western termination, the width of the deposit is nearly 16 feet. Of its depth we are unable to speak, as it has nowhere yet been fathomed to a greater extent than about 10 feet; but it may be inferred, from its being found on the surface for nearly two miles, notwithstanding that the country traversed by it presents an undulating outline, with alternate elevations and depressions, amounting to at least 50 feet, that it penetrates to a considerable depth into the substance of the rock. We traced the course of the mass from this point for about a quarter of a mile over a ploughed field, guided by the projecting portions of the mineral which protrude at intervals through the vegetable mould, or by the fragments of it which have been brought up by the plough. We thus followed it up a gentle acclivity, and then again down a corresponding descent, till we reached the road leading from Logrosan to Guadaloupe, where it was first noticed by Bowles. Here, as the rock had been already worked, we had the best opportunity of examining it; and accordingly, although we caused excavations to be made in one or two other places, in order to satisfy ourselves that its general characters were the same throughout, yet our knowledge of it is principally derived from this one locality. In this place it crosses the road obliquely from NNE. to SSW., interstratified with a rock consisting of a compact form of clay-slate, in which the slaty cleavage was indistinct, and which is disposed in almost vertical strata, inclining however from the granite of the adjoining hill, which has been already noticed. The width of the phosphoric deposit at this spot is not more than seven feet; and it is to be remarked that, out of this mass, the central portion only, to a thickness of almost three feet, consists of phosphate of lime in a state approaching to purity.

"The phosporite differs, of course, in composition in different parts of the deposit; but no specimen which has been examined appears perfectly free from foreign matter, there being, in every instance, traces of iron, partly at least in the state of peroxide, together with one or two per cent. of silica, and a large proportion of fluoride of calcium.

"The following are the results of an analysis made of one of the purest specimens that could be selected, or, we should rather say, the mean of two analyses, in either of which similar quantities taken from the same specimen were operated upon, the results of the two agreeing nearly together:

Silica	1·70
Peroxide of iron	3·15
Fluoride of calcium	14·00
Phosphate of lime	81·15
	100·00

There was likewise 0·2 per cent. of chlorine, united with calcium, present in the mineral."

The next question examined by Dr. Daubeny (who brought to England for this purpose a supply of the native Spanish phosphorite), was its fertilizing powers. His report of his trials with turnips at the Oxford Botanic Garden in the season of 1844-5, are valuable. (Ibid, vol. vi., p. 329). The result will be readily understood from the following little table, which gives the produce in pounds per acre:—

	Roots. lbs.	Tops. lbs.
Soil unmanured	14,298	30,591
Spanish phosphorite, applied alone, 12 cwt. to the acre	28,639	42,016
Spanish phosphorite, with sulphuric acid, 12 cwt. to the acre	30,869	34,476
Shavings of bones, 10 cwt. to the acre	19,239	35,210
Chemical manure—Company's guano, 260 lbs. to the acre	26,058	28,300
Nitrate of soda, 1½ cwt. to the acre	28,459	45,302
South American guano, 260 lbs. to the acre	31,114	47,060
Bones, with sulphuric acid, 11 cwt. to the acre	31,898	44,421
Graham's animal compost, 260lbs. to the acre	32,109	33,603
Sulphate of ammonia, 1 cwt. to the acre	32,670	46,464
Bones finely powdered, 12 cwt. to the acre	36,185	45,446
Potter's guano, 260lbs. to the acre	37,201	42,564
Stable dung, 22 tons to the acre	39,476	49,912

On Chevalier barley another set of experiments were instituted by Sir. H. Verney, with the same native phosphate. The soil employed for this purpose, in 1845, was a heavy sandy loam, resting on a clayey subsoil. The Chevalier barley was planted in April, and the results obtained from 10 different plots are thus stated (Ibid, p. 333)—

	Manure per acre. Tons.	cwt.	qrs.	Produce. Tons.	cwt.	qrs.
Soil simple	0	0	0	3	6	2
Spanish phosphorite and sulphuric acid	0	18	0	6	3	2
Spanish phosphorite	0	18	0	5	3	2
Superphosphate of lime	1	5	3	5	6	3
Unburnt bones	1	7	0	5	0	0
Burnt bones	0	18	0	5	3	2
Potter's guano	0	3	0	4	5	0
Pigeon's dung	0	18	0	7	5	0
Graham's guano	0	3	0	6	5	2
Stable yard dung	20	0	0	8	2	0

These experiments evidently support a long-since-adopted conclusion, that it is the phosphate of lime of the crushed bones to which their virtue as a manure must be attributed, and in this Dr. Daubeny too agrees. He remarks—"As the Spanish phosphorite, which appears to act so beneficially, is wholly destitute of organic matter, it seems to follow that the more valuable portion, at least, of what is applied to the land when bones are scattered over it, is the phosphate of lime, and not, as some have supposed, the oil or the gelatine." The action of sulphuric acid upon bones, by materially decomposing the organic portion, and yet adding to their fertilizing power, was another fact which tended to the same conclusion.

I next proceed to examine one or two of the sources from whence this native phosphate may be readily obtained, and following the order in which the English specimens have been employed, let us commence with the coprolite of the Suffolk craig formation. The craig is composed of a mixture of fragments of fossil shells; sand, mixed together in a confused mass; carbonate of lime, with some phosphate of lime, these are its fertilising ingredients, but it was long before the craig was used as a manure. Chance made its merits known by an accident, which is thus described by Captain Alexander (Jour. R. A. S., vol. iii., p. 182):—"The shelly depost, denominated red craig, consists of shell mixed with sand and gravel. It is barren in its own nature, and is therefore used instead of gravel to form garden walks; it was first discovered to be useful to certain soils from the following accident: A person was carting some of the craig for a garden walk, and in conveying it over a black barren soil, the cart broke down and scattered the contents; the driver, instead of collecting the craig, spread it over the surface where it lay. The field was after this prepared for turnips in the usual way, and, much to the surprise of the occupier, there was a good crop of full-sized turnips where the craig had been cast, while the rest of the field afforded only a miserable crop of stunted growth. By this accident was the application of craig first made efficient, and it is almost impossible to calculate the increase added to our agricultural produce by this discovery in the craig districts." It happens, however, that the salts of lime which the craig contains do not exist in a sufficiently concentrated state to render it worth the carriage for any considerable distance. Its use, therefore, is confined chiefly to the neighbourhood of the pits from whence it is dug—there, indeed, it is generally and copiously applied as a fertilising dressing by the excellent Suffolk farmers. But till recently, distant cultivation had not the benefit which these deposits offered. More recently, however, certain dark brown silicious-looking stones, diffused in considerable abundance through the craig, attracted the attention of the farmer and the chemist. Upon these being examined they turned out to be the fossil substance, well known under the name of coprolite, which is supposed to be the fæces of an extinct race of animals. The following analysis (for which we are indebted to the London Manure Company) will prove to the farmer their value:—

100 parts of this substance contains

Phosphate of lime	56 parts
Phosphate of iron	14 „
Carbonate of lime	21 „
Alumina	4 „
Silex	2 „
Carbonaceous matter	1 „
Moisture	2 „

These we have reason to believe have been lately beneficially employed in the preparation of the superphosphate of lime, so that a native bed of fossil guano, as it were, presents itself for the service of the English farmer, of which he can readily avail himself. More recently still, the existence of the native phosphate of lime in considerable proportions has been detected in the lower chalk formation by Mr. J. M. Paine, of Farnham, in Surrey; Professor Way, and Mr. J. C. Nesbit. The detail given by Mr. Paine (Agricultural Gazette, 1848, p. 121) is full of interest to the farmer. He says, "It has long been a remark of common notoriety that the soil of the lower part of the true chalk formation possesses remarkable powers of fertility, very little or no manure being required to produce heavy crops; and especially with regard to the application of bone manure, the employment of it being in most instances positively useless; and upon my own estate, in this geological position, certain spots of land have especially attracted my notice during a period of many years, on account of the exuberant fertility manifested by the crops of corn and hops, and also by reason of the remarkable colour of the soil, a very conspicuous green. It was, in fact, produced by an outcropping of the true upper green sand. One arable field in particular has been notorious for growing heavy crops, almost without the application of manure. I believe it has only been manured thrice for upwards of 20

years, at distant intervals, viz., with bones, rags, and last year with a slight dressing of guano. The bones were applied about 15 years ago, being the first trial of bone manure on my farm; not the slightest benefit was ever visible, and the failure caused the suspension of the use of bones for several years." After detailing the success of Mr. Nesbit in discovering in the marls of his estate the phosphate of lime, Mr. Paine adds:—"Towards the end of November last I applied to a mutual friend to ask Professor Way (with whom I was previously unacquainted) if he would undertake the examination of my marl, as I always intended to avail myself of the first opportunity of seeking the assistance of the new association. He kindly consented to my proposal, and on the 1st of December I sent him a small parcel of the green marl in a letter. I selected the greenest portion of the marl I could find, as I at that period believed that the phosphoric matter resided in the green particles. He subjected the sample to examination, and I was much disappointed on learning from him that he could detect no valuable amount of phosphates. I had also sent a portion of the same marl to another experienced analytical chemist, and from him, too, I obtained a similar discouraging report. Upon this I forwarded to Professor Way a large box of marl, filled indiscriminately as it was dug from one of my pits, and I requested him to subject the whole to the most rigid examination. This he did; and I soon received from him a most favourable report, and also the important clue by which we were guided in our future reseaches after the origin, or rather the proximate origin, of the phoshates.

"The following is Professor Way's analysis of this box of marl (dry):—

Organic matter	4.59
Phosphate of lime	4.47
Magnesia	1.70
Carbonate of lime	8.00
Alumina	9.10
Protoxide of iron with a little peroxide	7.99
Sand, quite white with a little clay	47.23
Soluble silica	16.12
	99.20

"The green sand absorbs water very rapidly from the air; this, and the solubility of the silicates in it, would render the soil a good one, even without the unusually large proportion of phosphates.

"At this time (29th Dec.) he commenced washing the marl in water, in the hope of concentrating the phosphoric acid. The experiment was eminently successful. In the first instance, the heavy sand being collected and analyzed, it was found to contain 8 per cent. of phosphate. This concentration led to the discovery of the condition of the phosphate. He then discovered that the phosphoric acid did not exist at all in the green sand as such, but in a certain enveloping yellow substance readily separable by washing; which, after drying, yielded rather more than 50 per cent. of phosphate of lime. He likewise found by this process of washing, that there were other certain dark brown lumps, some of which contained upwards of 70 per cent. of the phosphate of lime."

During a subsequent investigation of these gentlemen, carried on together at Farnham:—"Out of the richest vein of one of the pits, we dug," Mr. Paine continues, "a mass weighing 32lb. This was thoroughly washed, and from it we obtained 14lb., or about 44 per cent., of clean hard fossil-like lumps of every size. There was not time for a rigorous analysis then, but a similar mass of 30lb. weight was subsequently forwarded to Mr. Way, which gave the following results. Of large and small fossils 61 per cent. of the bed were separated by washing; 10,000 grains weight of these fossils broken down gave an average composition of—

Very fine sand	9.84
Silica (soluble)	2.36
Organic matter	3.26
Oxide of iron and alumina	4.61
Carbonate of lime	15.92
Lime in combination with phosphoric acid	35.60
Phosphoric acid	27.60
equal to 56.90 of bone earth phosphate	
Magnesia and loss	.81
	100.00

"The exact geological position in which this stratum is found at Farnham is in the lower part of the lower chalk, and invariably lies (when found at all) upon the hard silicious limestone rock, which is here used as a building stone. Although the green sandy marl itself, which first attracted my notice, contains no phosphoric acid, it is still, so far as my own researches have led me, an unfailing concomitant of the rich fossiliferous beds. It is not developed in this parish to any very considerable extent, and the greater part of it is on my own land; probably I may have some five or six acres. In the part where I am now excavating, we obtain from ten to twenty cwt. per superficial yard, which is carted away for subsequent washing, &c., besides three or four tons per yard of surrounding matter, which probably contains from one to five per cent. of phosphate of lime; and this refuse we cart away for manure upon those adjoining fields, which we know from experience to be deficient in phosphates. The bed in this parish extends altogether to rather more than a mile in length, in nearly a straight line from west to east; but in most parts it is very narrow, and in many places has been cut through by valleys of denudation."

As might naturally be expected, the announcement of these discoveries has induced researches similar to those to which I have alluded in other portions of England. At p. 265 of our present volume will be found an analysis of "a black marl" at Broughton, in Wiltshire, by Mr. G. Austwick, from which it appears to contain more than four per cent. of phosphate of lime. In other districts there is little doubt but that this native salt may be procured in sufficient abundance for the use of the farmer. I have seen, for instance, in some parts of Northamptonshire and North Wiltshire, great masses of fossil remains, dispersed on the surface of the ground, which would lead to the conclusion that these specimens might be obtained in sufficient abundance to amply repay the cultivator for the expense of their collection. The enquiry is of the highest importance both to the landowner and to the cultivator, for by the use of this substance, either by reducing it to powder, and then treating it with sulphuric or muriatic acids, or by merely pulverising it, the expense of a powerful and essential fertilizer is most considerably reduced. It will be noted by the farmer that in the trials of Dr. Daubeny which I have given, that the use of the powdered phosphorite produced results nearly as great as when it was also treated with sulphuric acid. I commend these researches to my readers, as certain, in some way or other, of producing the most beneficial results to the cultivators of almost every considerable agricultural district, few of which I believe to be so far removed in any portion of these islands from this native salt, in some combination or other, as to preclude its profitable employment.

EXPERIMENTS ON THE GROWTH OF CLOVER.

BY A FARMER.

It would be difficult to estimate the improvement in farming which has been consequent on the introduction of clover into the general system of cropping pursued in this country. Previous to that time it was customary to have white crops one after another until the land was exhausted, and almost the only means of restoring fertility to the tillage land was derived from the permanent grass attached to the farm. One of the standing rules in all leases, was a heavy fine should the tenant dare to plough out any of this meadow land, without first obtaining permission from his landlord. When clover was first introduced the landowners were very averse to its cultivation, alleging that it was too impoverishing. It has, however, slowly, but surely, worked its way—so much so, that in Berwickshire, and the Lothians of Scotland, there is now little or no permanent grass to be seen; and throughout the whole of the United Kingdom (except the worst part of Ireland, where the old system is even yet pursued), clover is now a recognized crop in every well-cultivated farm.

The chemistry of practical farming is too much in its infancy to allow me to give a decided opinion, but recent investigation seems to give very plausible reasons for the place which clover has taken in our rotation. It seems that the object gained by introducing the clover between the white crops of the old system I have just named, is to allow a sufficient quantity of the silicates and phosphates, required by the cereals, to be disintegrated by the action of the atmosphere, and which, it appears, does not take place fast enough when the white crops follow each other in close succession. It can scarcely yet be considered as a settled point, yet it seems probable that each natural order of plants requires different inorganic food from the soil: though of course this cannot be said to be universally the case, yet there seems little doubt of it with regard to the few plants cultivated by the farmer. The cereals and grasses of our farms belong to the natural order *Gramineæ*; and the clover, bean, pea, and tare belong to the natural order *Leguminosæ*. It would therefore be expected that they would require different food from the soil; and recent investigation, by analyzing these different plants, so far bears out this view of the subject, that Liebig has proposed to name the former *Silica plants*, and the latter *Lime plants*;* this nomenclature being founded on the comparative abundance of silica and lime in the ashes of the grasses and clover. The ordinary four years' rotation, then, needs little explanation, except to say that, whilst the wheat and oat crops remove silica from the soil, the clover removes lime—to be again restored by the action of a bare fallow, or turnip crop eaten on the ground. This, of course, does not explain everything connected with the rotation of crops; but every farmer is aware that he cannot, even on the best land, trespass on a different course of cropping from that above named without suffering in the end by diminished produce.

* "Agricultural Chemistry."

Though this part of the question is yet unsettled (like too many others in practical agriculture), I think it better to give all the information which the researches of Liebig, Boussingault, and others have thrown on the subject, and look forward with every well-wisher to the farmer, to the further results to be expected from their labours.

There are several different varieties of clover, and as they vary in their value to the farmer, and at the same time seem to possess some different properties, I think it as well to describe them in detail.

I. *The Hop Trefoil* (*Trifolium procumbens.*)—This little annual plant does not form a very important part of our clover crop; it, however, deserves notice, as it has the important advantage of being hardy, and will grow upon land tired or sick (as it is called) of the other kinds. Cattle do not eat this clover well when it is cut green, though I have not noticed that they refuse it when made into hay. Seldom more than one pound of seed per acre is sown; and the plant is too well known to every farmer, by its yellow flowers, to need further description.

II. *The White or Dutch Clover* (*Trifolium repens*).—When the clover is only intended for one year's grass, I have of late years abandoned this plant; it seems so delicate, and, by the failure of the seed, yields so little produce; but when sown for two or more years' pasture, this clover furnishes an exceedingly close sweet herbage. And every one must have noticed the beautiful growth of white clover which sometimes springs up in a meadow field, after lime has been applied as a top dressing. This seems to be the only plant of this species on which the lime produces this effect. It is perennial.

III. *The Common Broad Clover* (*Trifolium pratense*).—This is almost too well known to need description, but it is of importance to distinguish it from the next variety. As far as I can judge, the clover usually sown on the farm is a biennial plant; though, according to Sinclair,* there is a perennial red clover (*Trifolium pratense perenne*), which it seems to be difficult to describe, as differing from this, even in botanical phraseology. I have never yet been able to find a perennial broad clover amongst the produce of the seed sown on my own farm.

IV. *The Cow Grass, or Tig-tag Clover* (*Trifolium medium*).—So called from its mode of growth, which is one very distinguishing mark between this and No. III.; and it will also be observed that the latter has a light coloured, heart-shaped mark in the centre of the leaves, not present in No. IV. I have been particular in pointing out the difference between this and the former variety, as the seeds are so much alike, and the broad clover, being much cheaper, is often passed upon the farmer as the cow-grass. As there is no doubt but that the latter is a perennial plant, it is the only red clover that can be depended on for forming a permanent meadow. It has also another property, making it really valuable to the farmer. I have found that this clover will grow when the land is quite tired of broad clover; and though it does not yield as much weight of produce, nor so good an aftermath, as a full crop of the broad clover, yet the greater certainty of its growth recommends it to our notice.

V. *Trifolium Incarnatum.*—This clover was introduced a few years ago; it was very much puffed at the time, but has not made way into general use. I only remember to have seen one field of this clover in Northumberland, and one in Somerset. It is characterized by the great beauty of its flowers, and is so sweet and succulent, that if game be numerous they injure the crop very much. As it is an annual plant, it is sown on the wheat-stubble after harvest.

The above clovers are sown in different proportions, and mixed with rye-grass of various kinds, according to the purpose for which the field is intended. As I always sow for hay, I find about 5 lbs. of broad clover and 2 lbs. of hop* are the quantities which repeated experiments have shown to be the best for my strong wheat soils.† Double the above quantity of seed did not produce the slightest increase of crop. A neighbour, who generally allows his land to lie two years in grass, sows 7 lbs. of broad clover per acre.‡ His land is of a light, mossy, nature; and he says that less than the above quantity has been found insufficient. I remember to have seen, upon the farm of Mr. Blandford, in Somersetshire, 14 lbs. of broad clover sown to the acre, without rye grass, producing crops unequalled in any other part of England or Scotland which I have seen. His clover was so rich and long, that the sheep only received a few square yards, at intervals of three or four hours. Though this quantity of seed would have been quite thrown away upon an ordinary farm, it did not seem at all too much there. Every other crop was in proportion: no bare fallows, and a constant succession of green crops, upon a sound wheat soil (formed, if I recollect right, from the old red sandstone), made Mr. Blandford's farm what many of the lecturers of the present day would wish to persuade the farmers of the poor, cold clays of North-

* "*Hortus Gramineus Woburnienses.*"

* With ¼ bushel of common rye-grass.

† They are formed upon the clay slate of the coal measures.

‡ Along with rye-grass.

umberland and Durham their own might easily be rendered.

Clover is usually sown on the white crop succeeding fallow or turnips, and except a slight harrowing and rolling to cover the seed, it receives little attention but rolling again to break the stubble before mowing. Some farmers put their sheep and cattle upon the clover for a short time after harvest, and again in the spring. I have often seen much harm done by this practice, upon the best soils, if the spring proved droughty; and upon strong clays it is quite inexcusable. As I am within the reach of manure, the clover is always cut twice. This, of course, cannot be recommended as a general rule, so much will always depend upon the situation, &c. A neighbour has, this last year, manured part of his clover; and as the produce was about 3½ tons of hay, I have no doubt but the 7 or 8 cart-loads of dung per acre did twice as much good as if they had been applied on the fallow two years before.

Though the clover requires so little attention after sowing, it is attended with peculiar difficulties of another kind. After having grown on the same land a number of years, the soil becomes sick, or tired of it, and obstinately refuses to produce it any longer, unless some change be made in the system of cropping. This is a serious loss to the farmer, without the land can again be restored to its original fertility. To gain this end I have tried manures of every kind, but without success. Lime seems to encourage the growth of white clover to a certain extent, but it cannot be depended on for the other kinds I have described. Having seen gypsum very much praised as a manure for clover, I tried it on a field which had become sick (as it is called), but I did not see the least difference in the ridges where it had been applied. Nor have I been able to observe that sulphate, muriate, and carbonate of ammonia, are of any more value than other manures, as a remedy to this evil. Here then is a serious difficulty; and I think that I will best explain how it is obviated on my own farm, by describing the course of cropping on 60 acres; for this purpose two rotations are followed:—

Rotation No. I.

Years.				
1.	First,	Wheat	60	acres.
2.	Second,	Clover	60	,,
3.	Third,	Oats	60	,,
4.	Fourth,	Fallow	60	,,
5.	First,	Wheat	60	,,
6.	Second,	Beans 30 / Clover 30	60	,,
7.	Third,	Oats	60	,,
8.	Fourth,	Fallow	60	,,
Years.				
9.	First,	Wheat	60	,,
10.	Second,	Clover 30 / Beans 30	60	,,
11.	Third,	Oats	60	,,
12.	Fourth,	Fallow	60	,,

Rotation No. II.

1.	First,	Wheat	60	acres.
2.	Second,	Clover	60	,,
3.	Third,	Oats	60	,,
4.	Fourth,	Fallow	60	,,
5.	First,	Wheat	60	,,
6.	Second,	Cow grass with clover	60	,,
7.	Third,	Oats	60	,,
8.	Fourth,	Fallow	60	,,
9.	First,	Wheat	60	,,
10.	Second,	Beans	60	,,
11.	Third,	Oats	60	,,
		&c. &c. &c.		

The above tables show what has been the result of my own experience, as the only way of ensuring good crops of clover. The object intended is to *introduce the bean* into the rotation, so as to avoid the repetition of the clover every fourth year. In Rotation No. I, it will be observed that in the 6th and 10th year I sow 30 acres of the land which comes in course for clover, with beans. This will cause the former crop to come every eighth year, instead of every fourth, and completely and satisfactorily obviate all difficulty from the *sickness*. When I find it inconvenient to have so much of my land under the plough, then I adopt Rotation No. II; and instead of clover in the 6th year, I sow cow-grass (with a small quantity of clover and Italian rye-grass), and in the 10th year 60 acres of beans, as in Rotation No I—this brings the clover twice in twelve years. I would, however, recommend No. I, whenever it can be conveniently followed, as decidedly the best course, though the cow-grass has the valuable property of producing a vigorous plant after the land is *sick* of broad clover, though it does not produce so good an aftermath as the latter.

The above may seem simple, but I have no hesitation in saying that *I have always found the regular introduction of the bean* a certain remedy to what would otherwise soon compel the farmer to relinquish the cultivation of clover altogether.

Should the soil not be strong enough for beans, peas or tares will also, though in a less degree, produce similar benefit.

If asked for an explanation of this action of beans, peas, and tares, I must plead ignorance; for, as stated in the commencement of this report, these plants, as well as clover, belong to one natural order; and chemical analysis has shown that

they remove (as nearly as possible) the same inorganic substances from the soil; so that the failure of clover on land which will yet grow beans, &c., cannot be attributed to the want of mineral matter, which is alike necessary to the growth of each.

It was [at] one time thought that plants, like animals, by discharging an excrementitious substance, rendered the land unfit for the same plant. But as this excrement has never yet been fairly detected and proved to be injurious, this explanation is very unsatisfactory.

From my own observation I am inclined to ascribe the failure of clover partly to insects; as I have seen a small brown beetle do great harm to this crop in the spring. As the majority of plants are liable to attacks from insects peculiar to themselves, it seems improbable that clover should be an exception to the general rule. It is quite possible that this insect, either in the egg or larva, may survive four years without clover, and yet be destroyed by eight years intervening, and the ploughing, &c., for beans, peas, or tares. I am also rather borne out in the latter explanation by observing that my neighbours, who are not so particular in changing the land with beans, frequently lose the oat crop by the ravages of the larvæ of the *Sipula Olearacea* (daddy-longlegs), the eggs of which had been deposited in the clover of the year before. I have never yet seen any harm done by this insect on *oats following beans*.

I have observed that the period when the land becomes tired, or sick, of clover varies very much; and though agricultural geology has not yet been closely attended to, limestone soils and subsoils seem to be the longest in arriving at this state. Some of my neighbours, whose land is formed from the new red sandstone of the coal formation, have not quite as much difficulty as I have on my own farm, the soil of which is formed from the clay slate of the same geological period.

Having now briefly stated my own experience on the culture and diseases of clover, I regret that this subject has not hitherto received the attention it so well deserves from scientific men; and should their researches at any future period point out a different explanation for the evil, it will hardly lessen the value of the remedy I have endeavoured to point out.

DRAINAGE OF LAND.

As every expression of sentiment on this important subject tends to elicit truth, I venture to offer a few observations. Public discussions show great diversity of opinions with regard to the best depth for drains as a general principle; the minimum depth advocated being 2 feet 6 inches, and the maximum depth 5 feet; my own predilection being in favour of drains 3 feet deep. Experience shows me that *two* tile drains 3 feet deep are not more cost than *one* tile drain 5 feet deep, consequently I prefer drains 3 feet deep, say at 24 feet apart, to drains 5 feet deep at 48 feet apart; inasmuch as the former gives *double* the number of drains for collecting water, and what is even more important, for the circulating air through the ground, and reducing by one half the area between the drains; their depth is sufficient to protect them against injury from above, and, if at proper intervals, to keep the active soil harmless against the bad effects, and yet within reach of the advantages, by reason of capillary attraction, from *below*. Their construction is always more practicable, both as to stratification and outfall, and their depth as far as atmospheric influence can beneficially operate. When deeper drainage is considered requisite, apply the boring irons; water may thus be brought to the drains at incomparably less expense than the drains can be taken to the water. With all submission, I beg to direct attention to a letter which appeared in the "Farmers' Magazine" of October last, wherein I proved the beneficial effect produced by a free circulation of atmospheric air through drains. And every day experience enables me boldly to affirm that drains 3 feet deep are by this means rendered equivalent to drains 3 feet 9 inches, if not 4 feet deep, without such assistance. The most convincing proof which occurs to me in favour of frequent over distant drains is (taking an extreme case), where a solitary drain is formed in the midst of very soft clay land discharging, it may be, an abundance of water, yet *without* improving the herbage or texture of the soil to any the least extent, on either side thereof; the conducting pores of the subsoil, *not* the drain, being glutted and preoccupied with water, there being no *neighbouring* drain to promote interchange of communication; consequently, fertile atmospheric air, which can alone ameliorate the condition of the subsoils, is wholly excluded. Such is always more or less the result of deep and distant drains; for however limited may be the space left in the centre beyond the influence of drains on either side thereof, it will be enough to prevent that free interchange or circulation of air which I have proved to be of so much importance.

S. Hutchinson.

LONDON FARMERS' CLUB.

MONTHLY MEETING OF THE COMMITTEE OF MANAGEMENT.

Monday, April 3.

Present—Messrs. E. Aitcheson, W. Anderson, J. Beadel, W. Cheffins, W. Fisher Hobbs, and W. Shaw. (London), W. Fisher Hobbs, Esq., in the chair. The minutes of the last Meeting were read and confirmed, and signed by the chairman.

The following gentlemen were elected members:—

C. Alexander, The Anberries, Suffolk.
J. Ambrose, Copford, Essex.
H. Levick, West Woodhay, Berks.
J. Tanqueray, Hendon, Middlesex.
W. Thurtell, Wighton, Norfolk.
D. West, Bryanstone-square, London.
J. A. Williams, Baydon, Berks.
G. Worthington, jun., Liverpool.

Some other names were read for the first time, and a variety of other business gone into.

AGRICULTURAL CHEMISTRY.—TURNIP CULTURE.

BY J. B. LAWES.

(Concluded from page 347.)

We have now given a history of our experiments upon turnip culture during the first three seasons of their course, so far as the conduct of them in the field is concerned, though none, as yet, of the results obtained in the two succeeding seasons, the last of which is now drawing to a close. Details of this kind having, however, already taken up much space, and sufficed, we hope, to elucidate some established rules of practice, we shall defer until a future occasion a further consideration of this branch of our evidence, and enter at once into an account of our researches in the laboratory, as tending not only to confirm or confute conclusions otherwise arrived at, but as opening out points of interest, both in science and in practice, not hitherto brought to view.

The atmosphere and the virgin soil being originally the exclusive sources, the former of the "*organic*," and the latter of the "*inorganic*" or "*mineral*" constituents of plants, it has been supposed that the amount of produce which a given space of ground would yield must depend upon its richness in those substances proper to itself, namely, the mineral constituents; and that these being supplied in full quantity, according to the indications of the analyses of the ashes of the crops it is wished to grow, the atmosphere would always prove an ample available resource for the more peculiarly vegetable matters. It will be readily understood that on such a view as this, economy in agriculture would be attained by a very different course of practice from that required were it to be shown that cultivation should effect an artificial accumulation in the soil of those constituents primarily derived from the atmosphere, rather than of such as more especially belong to its own constitution.

The theory referred to has led to the analysis of the ashes of a great many agricultural crops, and upon the data thus obtained (rather than upon a consideration of the requirements actually induced by an artificially enhanced vegetation, or of the real source and destination of the constituents under a course of practical agriculture) recommendations to the agriculturist have been founded, the validity of which it was desirable should be tested by actual experiment, as well as by the presumed dictates of experience. The field results which we have detailed, both upon the subjects of wheat and of turnips, are unfavourable to these opinions and recommendations, and analysis will be found to bear testimony in the same direction.

A knowledge of the composition of our crops, as affected by climate and cultivation, is however of great importance, not only as showing what are the sources which must be relied upon for the various constituents, but as assisting a judgment of the feeding value of the produce, and of the *economy* of the means to the adoption of which the variations in composition may be traced. It is more especially with a view to these points of interest that our results have been sought, and that their bearings will be now considered.

In the course of an analytical examination of an agricultural specimen, the first steps are to determine the per-centages respectively of dry vegetable substance and of mineral matters. For this purpose a known weight of the produce is exposed for a length of time to such a temperature as will only expel all the water it contains; a portion is then burnt to an ash, which is presumed to retain all the "*mineral*," but none of the "*vegetable*," substances of the specimen, the latter having been consumed and vaporized by the burning process. The knowledge which these simple experiments may afford is never to be overlooked in considering the composition of an agricultural product, and estimating its probable value, or the economy of the manuring, or other means which have been employed in its growth. A judgment formed thus alone, however, of the comparative characters of different specimens would be fallacious, owing chiefly to the facts that the dry matter of different specimens of the same kind of plant may differ much in composition, and that a very large proportion of our agricultural produce is not allowed to ripen its seed and attain a somewhat fixed condition of dryness not materially affected by collection, storing, and transmission, but is taken whilst the vital circulation of the plant is still proceeding with considerable vigour, causing, long after removal from the land, a rapid exhalation of watery vapour, tending very much to mislead as to

the amount of dry matter really contained in the substance under examination. Unless, then, a series of such specimens—the comparative characters of which are to be estimated—be treated in every respect similarly, as to time of gathering, weighing, &c., serious errors must occur.

When ultimate ripened products are the subjects of examination, there is little difficulty in conducting a series of drying experiments, so that the results shall be true indications of the differences really dependent on climate and culture; and although in such cases the range of variation in the amount of dry matter is small, yet the variations themselves are very significant, bespeaking at once the conditions of growth, and, within certain limits, the probable qualities of the products.

There can be little doubt that, after reliable standards have been fixed, a knowledge of the true undoubted per-centage of dry matter in specimens of green produce also might materially aid our judgment of their other characters; but, as yet, neither have we these standards, nor are the methods of different experimenters so uniform that their results can compare one with another. So little, indeed, is really fixed and generally admitted regarding both the methods of and the proper inferences from such experiments, that the results of the same operator will, in his own view, be the more doubted the more he learns of the lesson they are calculated to teach; and before there can be any common argument or comparison conducted on such subjects, there must be some uniformity of method agreed upon. In illustration of this necessity one or two experiments only are needed.

A quantity of turnip-leaves were taken direct from the field to a barn about sunset, and were immediately weighed into lots of 25 and 50 oz. each. These bundles were laid upon straw, and on re-weighing the following morning were found to have lost more than 6 per cent. If the leaves gathered in the evening had not been weighed for drying until the following morning, an error of 1 per cent. or more in the estimation of dry matter would thus have arisen. We have elsewhere stated that 100 oz. specimens of green wheat plant lost invariably from 7 to 9 per cent. during the process of separating from each other the leaves, the ear, and the stem, although two persons were employed in the operation.

Again, five turnips, with their leaves, were found to weigh as soon as gathered 16 lbs. 4½ oz.; after exposure two days and nights upon straw, under cover, they weighed 15 lbs. 5½ oz.; and after three days and nights more, 14 lbs. 8½ oz. Thus, if after being gathered 48 hours, 100 oz. had been taken for a drying experiment, it would have been equivalent to 106 oz. of fresh plant; and if after five days, to 112 oz. Five plants were next taken, and the leaves cut off, leaving perhaps two inches of stem upon the bulbs. The turnips, thus freed of their leaves, weighed 12 lbs. 8½ oz.; after 48 hours on straw, under cover, 12 lbs. 4½ oz.; and after 3 days more, 11 lbs. 3¾ oz. In this case 100 oz. taken after being gathered 48 hours would have represented 102 oz. fresh bulb; and after 5 days, 106 oz. These turnip experiments were made in cold October weather; but the amount of loss sustained would of course depend much upon the vigour of growth of the plant, upon the state of the weather at the time, and the temperature of the place where the plants were kept.

It is evident, then that very serious errors may arise when specimens are received from a distance, or even when they are not, unless special precautions be taken, according to the nature of the produce under examination. Indeed it is exceedingly difficult, when fully aware of these circumstances, so to conduct an extensive series of comparative experiments on green or succulent substances as to obtain results which shall be both actually and relatively to each other open to no objection.

When, in the experiments quoted above, bulbs with the leaves, or the leaves alone are taken, the loss is seen to be much greater than when the bulbs alone are operated upon. This is what might have been anticipated, and shows clearly that the effect is due to the continuance of the natural circulatory processes of the leaves after removal from the land.

In operating upon bulbs or roots which are in contact with the soil, we meet with a difficulty of another kind. In such cases there is always a quantity of soil adhering to the specimens, which, if not removed, will affect to some extent the determination of dry matter, and still more seriously that of the mineral matter. A single bulb may be cleaned sufficiently by careful picking and wiping, but an extended series of determinations cannot be conducted under equal circumstances and with the necessary despatch without washing, by which soluble substances may to some extent be removed, or an absorption of water may take place. With the view of ascertaining the degree of error to which the washing of bulbs for drying and burning may lead, six lots, consisting each of five turnips, were taken, and the leaves were cut off, leaving a sufficient handle; three of the lots were carefully cleaned without the use of water, the other three being scrubbed with a brush in water, in which they were allowed to remain for ten minutes or a quarter of an hour; they were then taken out, rubbed dry with a cloth, sliced, and weighed. After exposure to a temperature of 212° for a sufficient time, the per-centages of dry matter were as under:—

Lot.	Without washing.	With washing.
1	8·36	7·96
2	8·03	7·79
3	7·64	7·30
	Average 8·01	7·68

There was evidently some difference in the specimens themselves, but the washing process gives in the main a less per-centage of dry matter than the other. Without washing there must always be expected a small excess, and with it a slight deficiency. In the particular instances quoted the deficiency was likely to be greater than in the usual conduct of the process, as the operation was purposely rather prolonged, that the extreme effects might be ascertained. It is admitted, however, that washing is an objectionable procedure; but when drying and burning experiments are conducted on an extended scale, the results will be more uniform in character, and more comparable one with another, than were any other method adopted, as all such either take up so much time that the specimens must, with the risk of change of weather, be collected at different times, or so many persons must be employed that the desirable surveillance is impracticable.

Having given thus far some general statement as to the manner in which our drying results have been obtained, those of our readers who understand such matters will be able to decide for what purposes our figures may be relied upon, and wherein they are likely to be wide of the exact truth. For ourselves, we are of opinion that, taken in series rather than individually, they may be trusted in discussing any points with which our general knowledge of such subjects will lead us to deal, and that they very closely represent the exact facts.

The following dry-matter results refer only to the produce of the third year's experiments (season 1845). The entire series is tabulated.

Were we to consider each of these results *seriatim*, with a view to trace the variations in the produce to variations in the composition of the mineral or of the organic manures, we should find numerous exceptions to any generalization to which we might thus be led. When we look, however, at extreme instances, or at series strictly comparable one with another, we cannot fail to see some undoubted general connexion between the amount of dry matter on the one hand, and such character or stage of growth as we have already observed to result from certain conditions of manuring on the other. We must be careful, however, to bear in mind the nature of the substances on which we have been operating, and the various circumstances which have been pointed out as tending to vitiate the legitimacy of any comparisons; otherwise we may place undue reliance on single results, or, finding these discrepant with others, come to the conclusion that we have no lesson taught us by so extensive and laborious a course of experiments. With our present limited knowledge, it is moreover desirable to exercise great caution in applying, to practice the indications of results of this kind.

It must be remembered, then, that the turnip plant cultivated as food for stock is gathered at no well-defined stage of its growth, but whilst containing a vast amount of circulating fluid, the proportion and concentration of which are subject to constant variation under the influence of the still active vital processes of the plant, the varying stores of moisture and of food presented to the roots, and the circumstances of temperature, light, and moisture of the atmosphere to which the leaves are exposed. In fact, we might liken the growing turnip to an animal whose gross composition would vary according to his resources of food and drink, and the condition of exhaustion or waste to which he is exposed. At one time his stomach and blood vessels are full, and at another their contents bear a much lessened relation to the more fixed portion of the body.

The water existing in the Norfolk white turnip bulb is seen to constitute more than nine-tenths of its entire weight; and if it should appear that the proportion varies according to the stage of growth, it will be admitted that the degree of maturity of a succulent plant which is to be the subject of a drying experiment, must be regarded, in deciding its probable yield of solid food, as resulting from various manures; for if the amount of water is found to decrease accordingly as the plant matures, that one which after an equal period of growth is found to contain most water would conditionally indicate a more extended further growth, and the manure under which it had grown might be better rather than worse than that to which the more solid turnip owed its character. Again: a series of lots under different manures, though they will be characterized by an undoubted difference in the tage of maturity of the plant, will each within itself exhibit a wide range of variation in this respect, and it is impracticable to gather specimens which shall certainly and exactly represent the characters induced by the manuring of the plots. In our experiments, from ten to twenty plants of average size, and which appear to be sound and firm, are selected from each plot, and from these, when washed and sliced, a weighed quantity is taken; in some cases 100 oz., and in some 150 oz.; in some more and in some less. The results given in the

TABLE showing the Per-centage of DRY MATTER in Specimens of Turnip Bulb, grown by various Manures. Season 1845.

Plot Numbers.	Description of Drilled Manures.	Drilled Manures only.	Drilled Manures, and top-dressing of Rape-cake.	Drilled Manures and top-dressing of Am. Salt.	Drilled Manures, and top-dressing of Rape-cake and Am. Salt.
1	12 tons farm-yard dung, ridged in	7·83	7·92	7·30	8·86
2	Unmanured		8·68	8·71	8·29
3	8 cwts. rape-cake	7·80	7·38	7·77	7·92
4	130lbs. calcined bone dust, 130lbs. sulphate of ammonia, 130lbs. hydrochloric acid	8·20	7·66	7·71	7·55
5	160lbs. superphosphate of lime, 130lbs. of sulphate of ammonia	8·77	7·95	7·64	7·73
6	160lbs. superphosphate of lime, 5 cwts. train oil	8·41	8·26	7·92	7·50
7	12 cwts. sulphate of lime	8·56	8·00	8·05	8·00
8	400lbs. calcined bone dust	8·71	8·57	7·77	7·83
9	400lbs. calcined bone dust, hydrochloric acid, = 268lbs. sulphuric acid (sp. gr. 1·70)	8·24	8·87	7·50	8·42
10	400lbs. calcined bone dust, 134lbs. sulphuric acid	8·11	8·65	7·46	7·70
11	400lbs. calcined bone dust, 268lbs. sulphuric acid	8·03	7·67	7·41	7·59
12	11 cwts. superphosphate of lime (land dug 9 inches deep in 1844)	8·71	8·19	7·29	7·61
13	400lbs. calcined bone dust, 268lbs. sulphuric acid, 134lbs. common salt	7·77	7·41	6·65	6·77
14	11 cwts. superphosphate of lime (land trenched 18 inches deep in 1844)	9·30	7·26	6·92	7·08
15	400lbs. calcined bone dust, 420lbs. sulphuric acid, 315lbs. soda ash	8·23	7·14	7·41	7·33
16	400lbs. calcined bone dust, 420lbs. sulphuric acid, 220lbs. magnesian limestone	8·69	7·61	8·20	7·22
17	400lbs. calcined bone dust, 420lbs. sulphuric acid, 470lbs. pearlash	8·27	8·49	7·27	7·79
18	400lbs. calcined bone dust, 420lbs. sulphuric acid, 105lbs. soda ash, 74lbs. magnesian limestone, 157 lbs. pearlash	7·95	8·36	7·42	7·77
19	As No. 18, with 1 cwt. sulphate of ammonia	7·83	7·69	7·45	6·89
20	As No. 18, with 3 cwts. rape-cake	6·98	7·64	7·95	6·86
21	400lbs. calcined bone dust, 400lbs. sulphuric acid	8·13	7·58	7·64	6·77
22	11 cwts. superphosphate of lime	8·24	7·83	7·36	7·38
	Mean results	8·22	7·95	7·60	7·58

table were obtained from specimen lots of 150 oz. each, and the soil, season, variety of turnip, and time of sowing and gathering, were the same throughout.*

From these remarks, our readers will be able to judge for themselves whether too much or too little is based upon our results. We feel, however, that it will be much more conducive to the interests of agriculture that the error should be in the latter rather than in the former direction.

The following mean results exhibit the general bearings of the experiments more clearly and safely than individual selections would do :—

Description of Drilled Manures.	Drilled Manures only.	Drilled Manures, and Top dressing of Rape-cake	Drilled Manures, and Top dressing of Amm. Salt.	Drilled Manures, and Top dressing of Rape-cake and Amm. Salt.
Mean of thirteen purely mineral manures	8.34	7.97	7.41	7.48
Mean of four experiments with alkaline phosphates ..	8.28	7.90	7.57	7.53
Mean of three experiments with superphosphate of lime	8.09	7.97	7.50	7.35

These means show a striking uniformity in the amount of dry matter in each column taken separately—that is, under the influence of various mineral manures, but a like resource for organic formations. Comparing column with column, however, we find a difference which, though not actually great, must be admitted to have some meaning, when we bear in mind the uniformity within the columns themselves. Were we to compare these effects of organic supply upon the per-centage of dry matter with those of the same conditions upon the average acreage produce, no correspondence, either direct or inverse, would be clearly defined; for we see in the table just given a pretty uniform depreciation from the first column to the third, and the fourth is not wide of the third, but the acreage amounts of produce were as under :—

Average acreage Produce of Bulb, in tons, cwts, qrs., and lbs.

Drilled Manures only.				Drilled Manures and Top-dressing of Rape-cake.				Drilled Manures and Top-dressing of Amm. Salt.				Drilled Manures and Top-dressing of Rape-cake and Amm. Salt.			
tons	cwts.	qrs.	lbs.	tons	cwts.	qrs.	lbs.	tons	cwts.	qrs.	lbs.	tons	cwts.	qrs.	lbs.
12	8	2	3	13	4	2	20	11	18	1	24	11	6	1	11

We have before stated, that at the time of the first gathering of the crops, a short time prior to which the specimens for analysis were taken, the plants growing by purely mineral manures were very markedly the *ripest*, their leaves having much drooped; next in order, in this respect, came those having rape-cake in addition; then those having sulphate of ammonia; and, lastly, those with both rape-cake and ammoniacal salt. The proportion of leaf to bulb at the time of weighing shows this to some extent. It was as under :—

	Drilled Manures only.	Drilled Manures, and Top-dressing of Rape-cake	Drilled Manures, and Top dressing of Amm. Salt.	Drilled Manures, and Top dressing of Rape-cake and Amm. Salt.
Proportion of leaf to 1000 of bulb..	326	421	559	669
Mean percentage of dry matter	8.34	7.97	7.41	7.48

* The conditions of manuring alone were different, and we may therefore rely upon the general indications of the experiments, so far as the effects of manures are concerned.

We have, then, the largest amount of dry matter with the ripest bulb and poorest supply of organic manure, very nearly the smallest amount of dry matter with the plants least advanced to the points of heaviest bulb, but which had the largest stores of food in the soil, and probably the prospect of the longest life and fullest eventual growth, at least of entire plant, if not of bulb itself. The second weighing of the crops did indeed show in this case an increase in bulb and a decline in the proportion of leaf to bulb. Here, then, the influence of manures is indirect; for the proportion of dry matter is seen to be mainly dependent upon the degree of maturity of the plant—and that this is affected by manures has been already shown; and since the largest proportion of dry matter may show an early advanced stage of maturity, frequently arising from an exhaustion of the materials of growth, it may in fact bespeak the worst manuring condition, all other circumstances being equal. It is evident then, that, even supposing the per-centage of dry matter to be an unconditional measure of the feeding value of any particular specimens, no comparison could be drawn respecting the efficiency of the manures by which they were grown, unless every other condition, whether of season, soil, maturity, or variety, were considered in their influence; and then, indeed, the effects of the manures may be due to a forcing, rather than to a supporting power. We shall have further proof, however, that the amount of water existing in the turnip depends upon the proportion of circulatory to the more fixed matter, and that, as the plant matures, that of the former diminishes and that of the latter increases; and it will also be seen that equal weights of dry matter may differ very greatly in probable nutritive value.

Before leaving the results of the table, we may observe that by this series of nearly 100 different manures, the utmost variation in the proportion of dry matter in the Norfolk white-turnip bulb is, after an equal period of time, 2.65, or about 2½ per cent., notwithstanding that there was a vast difference in the stage of maturity of the plants; and it is thought that if the specimens could have been taken each at the point of its fullest growth, the variation strictly dependent on manures would have been much less. The highest per-centage of dry matter in the entire series is 9.3—all the rest are below 9, more than half below 8, and several below 7; the limit of difference, even under the actual circumstances, is, however, in by far the larger number of cases within 1 per cent. Boussingault gives 7.58 per cent., which agrees pretty well with our determinations, the mean of which is 7.83; other observers having found a range in the proportion of dry matter of the turnip-bulb from this amount to nearly double, have attributed much of the variation to the conditions of manuring; but the foregoing facts, in conjunction with those we shall now state, will show that no judgment of the effects of manures in this respect can be formed unless the experiments are made with the same variety of the plant.

Description of Turnips.	Per-centage of Dry Matter in Turnip Bulbs.
Norfolk White (lowest of experimental series)	6.65
„ (highest of experimental series)	9.30
„ (mean of experimental series)	7.83
„ by farm-yard dung in experimental series	7.83
Green common turnip, by farm-yard dung	7.94
„ „ by superphosphate of lime	7.94
Swede, Skirving's green top	9.04
„ „ purple top	9.61
„ purple top (old variety, name unknown)	12.25

The specimens here referred to were grown in different fields, and by different manures, and several of them in the ordinary course of the farm. The 90 lots of experimental Norfolk whites give a number for the mean per-centage of dry matter identical with that found under farm-yard dung, and their extreme variation is 2.65. The two specimens of green common turnips show the same amount of dry matter with a difference of manuring. The various swedes again differ considerably from one another, yet in a greater degree from the common turnips. The extreme variation in the entire series quoted is from 6.65 in the Norfolk whites to 12.25 in the purple-topped swede, or more than 5½ per cent.; but there is little doubt that it is dependent on the variety of plant, rather than upon any effects of manure or culture.

As a general inference from our results, we may state that the mineral and carbonaceous manures, which we have before seen to favour bulb-formation—that is, to determine to an early maturity—are those which in a given time will yield the largest per-centage of dry matter in the bulb; but nitrogenous manures, on the other hand, which, when

in excess, do not enhance bulb-formation (a process of deposition), but rather an extension of the leaf or more vascular system of the plant, involving a prolonged tendency to active circulation, and consequently a higher amount of vehicular watery fluid in proportion to fixed substance, will afford a smaller per-centage of dry matter in the produced bulb.

Were we, assuming bulb-formation to succeed leaf-formation, to judge from some analogy furnished by other plants, we might expect that the earlier organ, the leaf, would contain a less per centage of dry matter than the later one, the bulb; but inasmuch as the dry matter is frequently about twice as great in the former as in the latter, any such reasoning would imply a wrong conception of the physiological relationship of the two organs.

We regret that the entire series of leaves of this 3rd year of our experiments was not collected for drying, and that indeed none were taken until after the first weighing of the crops, a few weeks later than the specimen bulbs were gathered. We shall not, therefore, employ the results for any more important purpose than to show how far the effects of manures are the same in kind as in the case of the bulbs, determining to the *depositing*, or to the more *circulatory* tendencies of growth.

Per-centage of Dry Matter in Norfolk White Turnip Leaf.

Plot Numbers.	Description of Drilled Manures.	Drilled Manures only.	Drilled Manures, and Top dressing of Sulph. Am.	Drilled Manures, and Top dressing of Rape-cake, and Sulph. Ammonia.
9	400 lbs. calcined bone-dust, hydrochloric acid = 268 lbs. sulphuric acid	13.63	13.23	12.57
14	11 cwt. Superphosphate of lime (land trenched 18 inches deep in 1844)	13.93	13.19	12.74
18	400 lbs. calcined bone-dust, 420 lbs sulphuric acid, 105 lbs. soda ash, 74 lbs. magnesian limestone, and 157 lbs. pearlash	13.79	13.48	13.46
21	400 lbs. calcined bone-dust and 400 lbs. sulphuric acid ..	13.33	13.12	12.68
22	11 cwt. superphosphate of lime	13.97	13.55	12.91
	Mean results	13.73	13.31	12.87

Here again we find no considerable variation, yet sufficient in amount and in uniformity to render the mean results reliable for our present purpose. The plants by mineral manures alone, in the first column, which were the furthest advanced in maturation (or almost past that point), give the highest per-centage of dry matter in the leaf as well as in the bulb. Those under the addition of ammoniacal salt give in the leaf a per-centage uniformly, but not so far relatively lower as in the case of the bulbs; but it must be remembered that the leaves were gathered much later, and indeed, in these cases as well as in those by the purely mineral manures, the point of maturity and exhaustion of soil-supplies for organic food had been approached or past. We find again that the more vigorous plants under both rape-cake and ammoniacal salt have, coincidently with the greater prevalence of vascular action, a less per-centage of dry matter.

Whilst we are writing, the specimens of the present season's growth are being operated upon in the drying bath; but as we have not given any account of our experiments since 1845, we need only say that succeeding results indicate the same general facts on the subject of dry matter as those to which we have drawn attention.

Having argued that, supposing the dry matter in the turnip were of uniform composition, a high per-centage can only indicate the amount of solid substance in a given amount of produce at the period of growth at which the determination is made, and does not by any means unconditionally show the efficiency of the manures employed, we shall turn our attention to the composition of the dry substance itself. It has been stated that dry vegetable produce contains the so-called *vegetable* or "*organic*" constituents, and the "*mineral*" or "*inorganic*," the latter being that portion which remains after the former is burnt away.

We shall first speak of the composition of the organic or vegetable part of the turnip, and shall endeavour to show its dependence on the manures by which the plant is grown, and the probable relative feeding values of different specimens.

We do not pretend to have reached further than the threshold of this enquiry, but still hope our results may furnish some interesting inferences. The organic matter of the turnip-bulb is composed of several complex bodies, some of which consist chiefly of carbon, hydrogen, and oxygen, whilst others contain nitrogen in addition to the other three elements. Other substances, such as sulphur

and phosphorus, are also found in these compounds, but in small quantities, and their presence or absence is immaterial to us just now.

Those of the compounds which contain nitrogen are in less proportion in plants than those in which it is absent; but nitrogen is a very important constituent in all food, so much so indeed that the comparative feeding value of different articles of produce may frequently be estimated by the amount of nitrogen they contain; and we shall, to some extent, act upon this assumption in what we are about to detail.

Those who have read the paper on Agricultural Chemistry in the last number of this Journal will bear in mind the remarkable fact there indicated, that the larger the amount of the nitrogen supplied by manure for the growth of wheat, the less was the per-centage of that substance in the produced grain. This is not consistent with the views generally maintained on this subject, but it seemed to us not only sufficiently proved by our experiments—but, when it was remembered that wheat-grain was peculiarly a *starchy* seed, and that starch contains no nitrogen, it was thought that whatever tended to the healthy action of the plant (as nitrogenous manures were found to do) would of necessity develop the special aim and products of the plant, and that in fact it was more natural to expect that the seed would under these circumstances be more *starchy* than that it would be more nitrogenous and less starchy. In growing *wheat-grain*, then, by means of *nitrogenous* manures the *per-centage* of nitrogen in the produce was rather diminished than increased. The following results will show whether a similar effect is observed in the growth of turnip-bulbs:—

PER-CENTAGES of Nitrogen in Dry Turnip Bulbs, the produce of different Manures.

Plot Numbers.	Description of Drilled Manures.	Drilled Manures only.	Drilled Manures, and Top-dressing of Rape-cake.	Drilled Manures, and Top-dressing of Amm. Salt.	Drilled Manures, and Top-dressing of Rape-cake and Amm. Salt.
9	400lbs. calcined bone-dust, hydrochloric acid, = 268lbs. sulphuric acid	1.46	1.93	2.82	2.22
22	11 cwt. superphosphate of lime	1.58	1.89	2.89	2.44
	Mean results	1.52	1.91	2.86	2.33

This is not the place to give any detailed account of our methods of analysis, but we may say that we think considerable confidence may be placed in the results, as a comparative series; and we believe them to be, moreover, not wide of the exact truth. If we had to give an opinion, however, as to the probable direction and extent of any error, we should suspect it to be in defect rather than in excess, and that if it exist it is pretty uniform throughout the series; that its probable extent is 0.10, and its utmost range 0.20. Should such general deficiency pervade our results, it is dependent partly on the fact that succulent specimens cannot be fully dried in air at 212° without some loss of nitrogen, and in part also upon certain practical difficulties attending the conduct of the determination of nitrogen in substances in which the actual per-centage is so small as in the instances before us. We may add that each of the results given in this paper is the mean of two determinations at least, and when there has been a difference of 0.10, a third has always been made.

Referring to the results of the table, and taking the columns separately, we see a very marked coincidence between the figures in each, and as marked a contrast between column and column; and if we call to mind the peculiarities of the several organic conditions of manuring, we shall see the influence of the nitrogenous supply to be exactly opposite to that observed in the case of wheat-grain, and in fact that the per-centage of nitrogen in the turnip-bulb bears a direct instead of an inverse relation to the predominance of that substance in the manure.

Thus in the instances quoted the per-centage of nitrogen in the dry substances of the produced bulb is by mineral manures alone 1.52; by the addition of rape-cake, which contains, besides a large amount of carbon, a considerable quantity of nitrogen, we have 1.91 per cent.; by ammoniacal salts, supplying abundance of nitrogen, but no carbon, 2.86 per cent.; and when to this exclusive nitrogenous supply rape-cake is superadded, we have 2.33 per cent. There is here seen, then, very evident connexion between the per-centage of nitrogen in the substance of the bulbs, and the supply of it in the manures employed. It is worthy of remark, however, that it is not the actual acreage quantity of nitrogen, but its proportion to other constituents, that is so clearly indicated. Thus in

the third column, with an acreage supply of about 60lbs. of nitrogen by manure, we have a per-centage of 2.86 in the dry matter of the produced bulb, whilst in the fourth column, with a supply of about 110lbs. per acre, we have only 2.33 per cent.; but when we remember that in the latter case there was a large amount of carbon in the manure, and in the former none, we have a clear illustration of the close connexion between the provision by manure and the composition of the produce. To render our meaning more intelligible, we may further explain that the nitrogen in the turnip, and indeed in food-products generally, exists in combination with carbon, hydrogen, and oxygen, itself comprising nearly one-sixth part of the thus constituted nitrogenous compound; the remainder of the dry matter consists of the compounds destitute of nitrogen, of which the chief constituent is carbon. Now in column 3 there was no carbon in the manure, but in column 4 a large amount was provided in the rape-cake; and notwithstanding that there was in this case not only the same amount of nitrogen supplied by ammonia salt as in column 3, but further, all that of the rape-cake, raising the total amount to nearly double, yet the supply, at the same time, of carbon favouring the formation of non-nitrogenous compounds gives a less proportion of those which are nitrogenous.

Again, if we compare the mean of these results with the mean per-centage of dry matter under the four conditions of manuring, we find with the lowest per-centage of nitrogen in the bulb the largest amount of dry matter, and with the highest per-centage of nitrogen the lowest amount of dry matter. There is then with the highest per-centage of nitrogen more of circulating fluid and less of fixed deposited substance than with the lowest; and since there was, moreover, not only a less matured bulb, but a less acreage produce of it in a given time than where the nitrogenous supply was less, we are led to infer that the high per-centage of nitrogen indicates a relative deficiency of carbonaceous substance, rather than a favourably increased amount of nitrogen. Indeed these results will confirm the opinion already urged—namely, that turnip-bulb formation is very dependent on an abundant supply of *carbonaceous matter to the roots*, and that the more the nitrogenous condition of manuring prevails over the carbonaceous, the more will vascularity and the less will special deposition be enhanced. Thus the highly vascular seed-forming turnip-plant is to the less vascular bulb-forming one, as the well-conditioned breeding or working animal is to the stall-fed fatting one. A considerable amount of nitrogenous as well as carbonaceous food is essential to both of these; in the one case, however, exercise tends to consume what in the other increases the bulk of the animal: so that, whilst the food taken may indeed in the two cases be very similar, yet the balance of it retained in the animal will be as different as, in the cases of the two plants, is attained by more directly varying the supply, and the peculiar habits of life and growth will be developed accordingly.

The following results further show how truly dependent is the composition of the turnip-bulb upon the provision by manure:—

PER-CENTAGES of Nitrogen in the Dry Matter of Turnip Bulbs, the produce of different Manures.

Plot Numbers.	Conditions of Standard Manuring.	Standard Manures only.	Standard Manures, and Top-dressing of Rape-cake.	Standard Manures, and Top-dressing of Amm. Salt.	Standard Manures, and Top-dressing of Rape-cake and Amm. Salt.
1	12 tons farm-yard dung	1.56	..	2.54	..
2	Unmanured	3.31	2.17	2.98	2.53
3	8 cwts. rape-cake	2.23	2.79	2.80	3.00

We see that the per-centage of nitrogen by farm-yard dung is 1.56, which differs little from either the results obtained by mineral manures alone, when all the organic supply was derived from normal sources, or from the number observed by Boussingault, which was 1.70. The addition of sulphate of ammonia to the farm-yard dung raises the per-centage of nitrogen in the bulb from 1·56 to 2.54, or by two-thirds of the usually-observed amount. Here, however, we have in the manure a large provision of carbonaceous matter, and, as before noticed, a coincidently less per-centage of nitrogen than when there was ammoniacal salt alone.

In the second line of the table we have some most interesting results, consistent with what have gone before, and further, affording a new and significant illustration of the office of the turnip as a *fallow crop*.

It will be recollected that the average weight of the bulbs on the unmanured plot was in this sea-

son of 1845 less than two ounces, and that the entire produce was only 13½ cwt. per acre. We find, however, that these stunted bulbs give a per centage of nitrogen higher than any in our series, even than those which had an unusually excessive supply by manure, and twice as high as the amount supposed generally to exist in the cultivated bulb. We may reasonably infer that, under the influence of season and a soil reduced to the lowest conceivable state of exhaustion, as regards its fitness for the growth of the cultivated turnip, the natural supply of nitrogen was, in proportion to that of other constituents, abundantly available to the special accumulative powers of the plant. In the same line we find, in the second column, that the supply of a top-dressing of rape-cake to this otherwise exhausted plot raises the acreage produce of bulb from 13½ cwt. to 7½ tons, and the average weight of bulb from less than 2 to nearly 11 ounces; and notwithstanding the nitrogenous supply of the rape-cake, we have, with its large provision of carbonaceous substance, the per-centage of nitrogen reduced from 3.31 to 2.17. In the third column, where there is added to the natural supplies of soil and season nitrogen, but *no* carbon, we had an evidently unhealthy condition; for the acreage produce, the size of bulb, and the number of plants were all less than where there was no manure whatever. Again, with these unfavourable circumstances of growth we have a very large per-centage of nitrogen—less, indeed, than in the unmanured bulbs, but considerably higher than when rape-cake alone was used. In the fourth column we have the same supply by manure of carbon and nitrogen as in column 2, with the addition, however, of the nitrogen as in column 3; and we find, as in other cases, that although the actual supply of nitrogen is greater than in column 3, it being proportionably less, the per-centage in the bulb is reduced.

In the third line the standard manure is rape-cake, the extra dressings being, as usual, a further addition of rape-cake, of ammoniacal salt, or of both. Comparing the per-centage of nitrogen by the drilled rape-cake, as in column 1, with that by farm-yard dung, we find that the rape-cake gives the highest, and we would suppose the proportion of nitrogen to carbon would be greater. In column 2, the amount of rape-cake being greater, the per-centage of nitrogen is greater. The *supply* of nitrogen to that of carbon is not, however, greater than in column 1; but we have before seen that a full quantity of rape-cake, without extra mineral manure, is not conducive to the most healthy growth of the turnip-bulb; nor, indeed, would the carbon so supplied be so completely and rapidly available as the nitrogen. The addition of ammoniacal salt in column 3 raises the per-centage of nitrogen from 2.23 to 2.80, and in column 4, as compared with column 2, from 2.79 to 3.00.

We have made other determinations of nitrogen in turnip-bulb, with a view to some more special points; but as we cannot discuss them in this paper without extending our remarks to an undue length, we shall defer notice of them until a future occasion. The results already given are moreover, we think, sufficient to aid our estimation of the characters of the turnip as a food and rotation crop.

An important fact elicited is that, within a certain range, which indeed is wider than has generally been supposed, the organic composition of the turnip bears a very direct relation to that of the manures by which it is grown. It is seen that the proportion of nitrogen usually found in the cultivated turnip-bulb may be nearly doubled by means of ammoniacal manures; and since we have stated that the feeding value of a crop may to some extent be measured by its per-centage of nitrogen, it might be supposed that we should be led strongly to advocate the use of such manures in the growth of the turnip. Our field experiments have already shown, however, that this would be a one-sided inference from these departmental results; and when we come to make some general application of our varied evidence to practical and economic agriculture, the true position and bearing of the different branches of the question will be indicated.

We regret that we have not as yet a sufficient number of determinations of nitrogen in the turnip-leaf to enable us to decide satisfactorily whether the per-centage be as clearly dependent upon the supply by manure as in the case of the bulb. The vigorous leaf being, however, highly vascular, and containing much of the still circulating unassimilated food derived from the soil, we might anticipate it would be so; but, on the other hand, if we look at the bulb as a reservoir of matters which are in excess so far as the natural seed-forming tendencies are concerned, we might expect the less artificial organs, the leaves, would be more constant in their composition. The following results will not assist us much in deciding these questions; they are, however, not without interest:

PER-CENTAGE of Nitrogen in the Dry Matter of Norfolk White Turnip-leaf.

Plot Numbers.	Description of Manures.	Dried at 212°.	Specimen dried below 200°, and Nitrogen calculated upon fully-dried Substance.
1	Farm-yard dung.	3.24	3.60
2	Unmanured	4.22	4.35

Here are given the results obtained from specimens of leaf, in one instance dried fully at 212° in the water-bath, and in another dried much below that temperature, the per-centage of nitrogen in this case being calculated upon the fully desiccated substance. The fact before alluded to—that succulent specimens frequently lose nitrogen at 212°—is thus illustrated: in one instance there is a defect of 0.36, and in the other of 0.13. We have met with a similar result with other succulent substances.

It will be remembered that the turnip-leaf was found to contain a proportion of dry matter more than half as large again as the bulb; and it is seen that in the case of the dung specimen the dry matter of the leaf has a per-centage of nitrogen twice as high as that of the bulb. A given weight of the fresh leaf would therefore contain more than three times as much nitrogen as an equal amount of bulb. Since, however, the bulk of the leaves at the time the turnip crop is gathered or consumed are past the condition in which our picked specimens were taken for analysis, it would be unsafe to employ these results for purposes of acreage calculation; yet they are in other respects to be relied upon.

Comparing the characters of the cultivated with those of the uncultivated plants, as shown by the analyses which have been given, we observe the decrease by cultivation in the per-centage of nitrogen in the dry matter is in the leaf only .75, but in the bulb 1.75; from which, again, we may perhaps gather that the cultivated bulb is the result of a continued accumulation of *secreted* matters, formed in quantity beyond the essential requirements of the plant as such: the leaf, on the other hand—containing, besides its own special structures and products, little more than those substances derived from *immediate* supply—has, therefore, a composition in a less degree varying according to the constant circumstances of growth, but comprising a larger proportion of unsecreted matter.

The fact that, notwithstanding the large nitrogenous contents of turnip-leaves, they should only be to a small extent valued as food, doubtless arises from the large amount of matters which they contain only brought within the range of the organism, themselves as yet unorganized, and existing as saline and other changeable fluids, to which we may readily attribute a medicinal and purgative, rather than a direct nutritive effect; elaboration to some extent being, as we are aware, an important element in the condition of food for animals. The low degree of stability in some of the nitrogenous contents of succulent substances, as indicated in the drying process, as well as our conceptions of the offices and physiological position of the different parts of a plant, bespeak, indeed, that where an active circulation is still proceeding, there will be found not only the actual and fixed, but also the prospectively possible constituents, the latter as yet only in a vehicular condition, and little influenced by the selective and appropriative powers of the organism. It is true that the varying character of the vital apparatus of different animals adapts them to the use of vegetable food in varying degrees and states of elaboration; but there seems to be a point in this degree of elaboration below which constituents lose their food qualities; or even it may be doubted whether, in such cases, the matters are not really as little truly vegetable as would be the watery extract of the soil as it is taken up by the rootlets, and from the condition of which little deviation has hitherto resulted from the vital actions of the plant. Such substances, indeed, may perhaps be considered as still belonging to the mineral kingdom, upon which animal life cannot be sustained.

Referring to the more special lesson of the experimental results last given, we notice that, whilst the leaf grown by farm-yard dung contains 3.60 per cent. of nitrogen in its dry matter, that grown without manure of any kind in a turnip-bulb exhausted soil has 4.35 per cent.; and it will be remembered, the bulbs corresponding to these specimens of leaf give respectively 1.56 and 3.31 per cent. We have, then, in the leaf as well as in the bulb, a larger proportion of nitrogen in the more natural but agriculturally useless turnip than in the cultivated one; and if we are right in considering that, within certain limits, the composition of a succulent, imperfectly elaborated vegetable will bear some direct relation to the supplies of food within its reach, we must conceive that there was, independently of art, a resource of nitrogen available to the uncultivated plants far beyond that of other necessary constituents. If, then, the powers of reliance upon normal supplies of nitrogen here observed are to be fully developed and turned to economical account, it is more especially by means of an artificial provision of the other constituents that this object will be attained.

We think that in these facts we have a beautiful illustration of some of the physical and physiological characters upon which depend, materially at least, the economic value of the turnip in rotation with corn. The true *economy* of alternate cropping, whilst, however, it is intimately associated with functional differences, such as we have shown to exist in the selected plants, yet depends much also upon the destination and uses of the produce, independently of which, the peculiar accumulative tendencies of the different crops could not be rendered profitably subservient. We shall not, however, consider the connexion between the various sources

of the economy of a rotation of crops, until, having detailed all the evidence which it is our intention to bring forward, we come to sum up, and apply our departmental results to the practice of agriculture.

We shall now give some account of the mineral substances found in the turnip. Our experimental results referring to this branch of the question are very numerous, and it was our wish to have considered them somewhat fully; but as our permitted space is already nearly exhausted, we must defer doing so until a future opportunity, and confine our remarks on this occasion to some explanation of the nature of the subject, and to indicating the general bearing of our evidence upon the conclusions which have been arrived at in the foregoing pages.

The knowledge which we at present possess of the amount, the composition, and the office of the mineral matter found in combination with the various definite organic compounds of which the solid and fixed substance of a plant is made up, is very limited; yet it is such as by no means leads us to assign to all the constituents of the ash of a crude vegetable product an essential position in the constitution either of the parts already elaborated, or of those which would result from the continued growth of the plant. It is obvious that an examination into the nature and constancy of the circumstances of growth, with which variations in the quantity and composition of plant-ashes are connected, cannot alone provide an explanation of the uses and importance of the mineral substances in the plant; it is, however, an essential step in the inquiry, and the results attained by it must materially direct and aid any collateral course of investigation.

In entering at once upon this part of our evidence, we may again state that we did not determine the amount of dry matter in the produce of the first two seasons' experiments: we are unable, therefore, to give the per-centage of ash in the dry matter in the specimens of those two seasons, and it will afterwards be seen that this particular is more significant than that of the per-centage in the fresh produce. On this account, and as we wish to compress our matter as much as possible, we shall not give any statement of the results of those two years, but only remark that a close examination of them affords like conclusions to those to which the third season's experiments leads us.

The per-centage of ash in the fresh bulbs, the mean of the produce of each of the four conditions of manuring, frequently referred to before, are given below.

Season.	General Description of Manuring.	Per-centage of Ash in Fresh Substance of "Norfolk white" Turnip-bulb.
1845	Mean of 13 experiments by purely mineral manures . . .	0.58
1845	Mean of 13 experiments by mineral manures and rape-cake added .	0.57
1845	Mean of 13 experiments by mineral manures and ammoniacal salt .	0.61
1845	Mean of 13 experiments by mineral manures, and both ammoniacal salt and rape-cake	0.60

These results are the actually found per-centages of ash, without any deduction for adventitious substances, such as siliceous matter and charcoal. The figures exhibit very slight differences, such as could not justify any important conclusions, were these contrary to otherwise probable indications. We find, however, that, slight as the differences are, they are such in kind as other circumstances would lead us to anticipate; and we need only notice that the per-centage of ash is seen to be highest where the nitrogenous condition of manuring was predominant, and lowest where the carbonaceous was more characteristic.

The variations are, however, more apparent when the per-centage of ash upon the dry, rather than upon the fresh, matter are given. The mean per-centage of the dry matter itself, and of its ash, in the specimens last quoted, and of the nitrogen in the dry matter of two of the specimens in each case, are here tabulated:—

General Description of Manuring.	Per-centage of Dry Matter in Bulb.	Per-centage of Ash in Dry Matter.	Per-centage of Nitrogen in Dry Matter (Specimens Nos. 9 and 22).
1845. Mean of 13 experiments by purely mineral manures	8.34	6.99	1.52
1845. Mean of 13 experiments by mineral manures and rape cake	7.97	7.21	1.91
1845. Mean of 13 experiments by mineral manures and ammoniacal salt	7.41	8.24	2.86
1845. Mean of 13 experiments by mineral manures and ammoniacal salt and rape-cake.	7.48	8.08	2.33

The coincidences here brought to view are of considerable interest, and clearly show a constant decrease in amount of mineral matter as the deposition of solid vegetable substance progresses. We have with the highest proportion of dry, the lowest proportion of mineral matter; and with the lowest amount of dry matter, the highest of mineral substances; and even with the slight increase in dry matter exhibited in line 4, compared with line 0, we have a decrease in the per-centage of mineral constituents. We can scarcely fail to recognise in these results a marked distinction between those constituents of the bulb which are as yet merely circulatory and unappropriated, and those which are secreted and fixed, the former being indicated by a small amount of dry and a large amount of ash, and the latter by a large amount of dry matter and a small amount of ash.

The connexion between the amount of dry matter and its per-centage of ash being admitted, and that between the amount of nitrogen, that of dry matter, and the condition of maturation having been pointed out before, it is seen that the views taken are fully confirmed by the relation of the ash in the dry matter to that of the nitrogen in the same. Thus we have in the table, with the most fixed matter and least nitrogen, also the least ash; and with the most ash and most nitrogen, the least dry matter. The relative tendency to bulbous deposition, or active vascular circulation, under carbonaceous and nitrogenous manures respectively, is here again exhibited.

It will be remembered that the specimens of turnip-leaf which were examined were gathered very late in the season, the few that could be selected green being taken. All were, however, far advanced in stage of growth, and it was found that, whether owing to the uniformity in the stage of growth, or to the essential tendency of the leaves, as different from that of the bulb, there was very little variation in the proportion of dry matter, compared with that observed in the bulbs. The following mean results will illustrate this:—

Reference to History of the Specimens.	Per-centage of Dry Matter in Leaf.	Per-centage of Ash in Fresh Leaf.	Per-centage of Ash in Dry Matter.
Mean of 9, 14, 18, 21, and 22, with mineral manures only	13.73	1.31	9.52
Mean of 9, 14, 18, 21, and 22, with mineral manures and ammoniacal salt	13.31	1.26	9.49
Mean of 9, 14, 18, 21, and 22, with mineral manures, rape-cake, and ammoniacal salt	12.87	1.25	9.72

The differences here seen are, as we have already implied, small; nor are the results so undoubted in their bearing as most that have been quoted; yet still we have with the smallest amount of dry matter, the largest per-centage of ash in the dry matter. The centre column shows the lowest per-centage of ash in the *fresh* leaf in this case; but it is of course the per-centage to *water*, rather than to dry vegetable substance, that is there indicated.

The comparative ash results that have been given, whether of the turnip-bulb or leaf, lead us then yet again to draw some distinctions between the fixed and the circulating constituents of a succulent plant, and to trace the proportion of these respectively to the stage of maturity of the organ, whilst this has been found to depend greatly upon the supply by manure.

Were we to compare the composition of the leaf, as thus far shown, with that of the bulb, and to attempt to apply on all points the same kind of reasoning as between bulb and bulb, or leaf and leaf, we should at once meet with inconsistencies;

for we find in the earlier product of the plant—the leaf—a much larger amount of dry matter than in the later one, the bulb; and again, with the higher per-centage of dry matter in the leaf, we have at the same time a much larger amount of ash in the dry matter. Such comparisons are, however, physiologically, quite inadmissible. Looking at the question in another view, however, we have attributed to the bulb, notwithstanding its large amount of water, in some respects a higher condition of elaboration, or fixedness in its solid constituents, than to the leaf. We have, indeed, supposed that bulb formation, in the degree in which it is developed for feeding purposes, is a deposition of matter existing in quantity beyond what is *essential* to the health of the natural plant, much as depositions are known to take place in animals under somewhat analogous circumstances.

The following comparative statement of the proportion of ash in the dry matter of the leaf, the bulb, and the seed of the Norfolk white turnip, will favour the view that the composition of the bulb implies a more advanced selective process than that of leaf:—

	Leaf.	Bulb.	Seed.
Per-centage of ash in the dry matter of	9.5	6.9	4.5

There is then, comparing one organ with another, as well as different specimens of the same organ, a diminution in the proportion of the mineral to the organic constituents of the plant the further we advance towards the matured results of the vital process. It is true that even in the seed the amount of mineral substances is greater than our conceptions regarding the composition of the definite compounds of which it is made up would alone have led us to anticipate; but numerous experiments with wheat grain show that, however small may be the differences exhibited in a series of specimens which can be compared with each other in this respect, yet they will indicate the less per-centage of ash in the dry matter, the higher the per-centage of the dry matter itself—that is to say, the more completely ripening processes have been developed. An *excess* of mineral matter in any such case may, to some extent therefore, be owing to an increased proportion of vascular contents to perfectly elaborated substance.

Admitting that the mineral substances found in the leaves of the turnip and of other plants are such in variety and in amount that we cannot suppose them to be all destined to enter into combination, and actually to constitute a portion of the fixed and essential formations of the plants, yet their presence within it is not on that account quite inexplicable. The experiments of De Saussure and others show that the rootlets of a plant take up the dissolved substances presented to them, exercising but little of selective power, whilst such as they have is rather of a mechanical than of a more purely vital kind. It is not to be wondered at, then, that the composition of the ash of highly vascular vegetable substances should exhibit a wide range of difference, according to climate, manuring, and soil. In such cases a large proportion of the mineral matters are distributed, not as constituents of the organized substance of the plant, but in its vessels and fluids, owing their quantity and character, to a great extent, to the external influences just referred to, but little, comparatively, to the selective processes of the organism.

The following mean results of analyses seem to show that the more the truly vital processes have been exercised, the more *special* does the composition of the mineral matter become:—

	Leaf Ash.	Bulb Ash.
	Mean of 24 Analyses by Mr. D. Campbell.	Mean of 24 Analyses by Dr. Gilbert.
Potass	22.05	44.84
Chloride of potassium ..	4.84	0.34
Soda	0.19	1.79
Chloride of sodium	6.15	6.86
Lime	30.53	11.40
Magnesia.....	0.82	1.46
Phosphoric acid*	5.05	7.89
Sulphuric acid	12.55	10.63
Carbonic acid	17.82	14.79
	100.00	100.00

These results being the mean of so many analyses as twenty-four in each case, the general character of the distinctions they exhibit may be fully relied upon. It is to be regretted that we have not an actual analysis of the ash of the seed of the Norfolk white, to place by the side of those of the leaf and of the bulb. We know, however, that phosphoric acid, potass, and magnesia are eminently seed-ash constituents, and that the existence of the vehicular element, chlorine, in a *perfectly ripened* seed is doubtful. The increase in the per-centage of the more special, and decrease in that of the less special constituents, are clearly shown in the results given above, as we proceed from the earlier formation to the later one, the composition of which is more influenced by the peculiar elaborative action

* In the analysis of the leaf and bulb ash, the phosphoric acid is calculated from the bone-earth precipitate, taking no account of the small quantity of iron salt usually present.

of the organism. Of the soda salts, indeed, the actual amount is somewhat larger in the bulb than in the leaf, but their proportion to the potass ones is much less.

It has been observed that the ash analyses of green crops seem to afford confirmation of the much-discussed theory of the substitution of potass by soda in plants, but that those of grain crops, on the other hand, do not serve the same purpose. It seems to us, however, that if in green and succulent substances, in which there exists a considerable amount of matter admitted by the roots, with but little of special selective power, the proportions of potass and soda may vary according to the variations in the soluble contents of the soil, but the further we advance towards the ultimate results of the organism, the larger is the proportion of potass to soda; there is in such a fact evidence against the supposition that the vegetable organism can substitute the one alkali for the other, for in the case assumed soda would seem to be present only *before* the *vital* selective processes had been exercised upon the matters brought within their sphere of influence. If, then, the theory referred to suppose a replacement of potass by soda, as an actual constituent of vegetable products, we think that facts hitherto observed are such as should tend to disprove rather than to prove its validity. On the other hand, we may well believe that the large amount of mineral matters admitted into a plant, beyond that which is likely to become fixed and combined with its structures or deposits, has, nevertheless, some office to perform. We know too little, however, of the means employed by the vital processes to enable us to assign special agencies to special substances; yet the presence of mineral matters not actually to take part as constituents, is by no means improbably of essential importance in determining the changes to which the circulating juices of the plant are subject; nor is it impossible that in such an office as this soda may substitute potass, and one acid another, that is to say, as *agents*, if not as constituents. It is indeed only by supposing some other requirement in the plant than that of mere provision of actual constituents, that we can in any degree account either for the extraordinary effects which a large supply of mineral substances is in some cases found to produce, or for its possession of the power by virtue of which so large an amount of such substances is taken up by its roots and distributed throughout its living organs.

It was our intention to bring forward many more results, both of the field and laboratory, relating to the important subject of root-culture, had our space permitted it. We have still eighty ash-analyses obtained from turnips, the history of the growth of which is detailed in this paper. It would also have been advantageous to give, in less technical language, a short summary of the results arrived at in the course of these experiments, for the convenience of those readers who are more conversant with practical than with scientific agriculture. Having, however, through the kindness of the Journal Committee, already extended our article to a length beyond what is usually allotted to contributors, we must conclude with a brief explanation of the means to be employed in the profitable cultivation of roots, and of the peculiar properties which they possess, and which constitute their value as fallow-crops.

A practical farmer, accustomed to consume his turnips upon his land every fourth or fifth year, might be inclined to doubt the correctness of any conclusions drawn from a set of experiments so artificial as the removal of five successive crops of turnips from the same field. It should therefore be distinctly understood that the object of these experiments is not to provide any examples for direct imitation in practice, but to enable us to ascertain the real characters of season, soil, and manuring required for the growth of the turnip, in order that, the principles of its culture being better understood, the practice of it may be more economically carried out. In our experiments upon wheat, given in the last number of this Journal, we showed that the produce of grain, beyond that which the soil and season gave in successive years, was dependent upon the supply of nitrogen; that 100 lbs. of rape-cake, containing 5 lbs. of nitrogen and 80 to 90 lbs. of carbonaceous matter, gave no greater increase of corn than a salt of ammonia containing 5 lbs of nitrogen and no carbonaceous matter; and that the produce from 14 tons of farm-yard dung upon the same space of ground year after year, was invariably less than that which was obtained from 2 cwts. of ammoniacal salts. The farm-yard dung and rape-cake increased the produce of grain in proportion to the amount of nitrogen which they contained; but as the rape-cake contains only 5 per cent. of nitrogen, and dung frequently not a ½ per cent., or one pound in 200, to what purpose can this bulk of carbonaceous matter be applied? As long as corn is cultivated, it is evidently of little use. Our experiments upon turnips answer this question in a most satisfactory manner. They show distinctly that the production of turnip-bulb depends upon the supply of carbonaceous matter in the soil, and that the true office of the turnip and other root-crops consists in converting the otherwise useless refuse of our corn-crops (straw) into a succulent and nourishing food for animals. During the five years over which our turnip experiments have been carried, in only one instance has the acreage weight of bulbs reached 17 tons,

We know that the mineral matter required by the turnip has not been deficient, and in many instances very large quantities of nitrogen have been supplied; but the essential substance, carbonaceous matter required for bulb-formation, has been but moderately supplied in the form of rape-cake; in one instance, where it was supplied in a larger quantity by dung, the greatest produce was obtained. Having, therefore, shown that to obtain heavy crops of bulbs, large amounts of carbonaceous matters should be supplied to the soil, and that dung is the cheapest source of this substance, the question next arises, What are the best substitutes for it? Dung is an article in which our farmyards are very apt to be deficient. It might be supposed that if sufficient carbonaceous matter were once placed upon a farm exporting only corn and meat, the loss in these two substances would not be greater than what would be supplied in return by the atmosphere; but the experiments of Boussingault and Dr. R. D. Thomson show that the amount of such matter respired by an animal, and therefore lost to a farm, is very great; indeed we should not be far wrong if we said that in feeding a crop of turnips by stock one-half of the carbonaceous matter in it is lost to the farm. To restore the loss of organic matter most economically, various processes are recommended: some advocate the consumption of artificial food with the turnip; some the employment of ammoniacal substances to collect carbon from the atmosphere; and some maintain that if the mineral substances composing the ash of the turnip were restored to the soil, it could supply itself with organic matter. To commence with the mineral manures—Analysis has shown that a great portion of the ash of the turnip consists of the alkalies potass and soda, and of magnesia; and these substances have been recommended in the formation of mineral manures; we think, however, that a careful examination of the position which the turnip-crop holds in a rotation, and the manner in which its organic and inorganic matters are applied in farm practice, will show that the artificial supply of alkalies can rarely if ever be advocated. A fair crop of turnips would contain in leaf and bulb about one ton and a half of dry matter, of which 250 lbs. would consist of minerals. Omitting those minerals which are of less importance, we may consider the composition of the crop as follows:—

Dry organic matter.....	3110
Potash.....	127
Phosphate of lime	50
Sulphate of lime.....	40

Of the organic matter, more than one half of the carbon, but probably scarcely one fourth of the nitrogen, is lost to the farm by the respiration and increase of the stock.* The amount of phosphate of lime removed would vary greatly with the nature of the stock consuming the turnips. A breeding flock or young growing animals abstract large quantities to be employed in the production of bone, while full-grown animals require very much less. Of the alkalies contained in the ash of the turnip the stock return to the soil all they take up. Barley generally follows after turnips, the greater part of which is taken to market. A crop of 40 bushels carries off phosphoric acid equal to about 28 lbs. of phosphate of lime, and 9 lbs. of potash. The clover following the barley, being consumed by stock, causes a further loss to the farm of organic matter and phosphate of lime, but no alkalies; while the wheat removes about 12 lbs. of potash and 30 lbs. of phosphates. We see, therefore, that much of the organic matter of the turnip is lost to the farm by respiration, the phosphate of lime largely in the formation of bone; while the export of potash is so small that the quantity contained in one acre of turnips would not be entirely exported under twenty years. It is clear, then, that unless by actual waste, there is, under an ordinary course of farming, without the use of imported food, a comparatively small decrease in the amount of available alkalies in the soil; but when we consider the vast amount of alkalies existing in the soil itself, and set free by annual decomposition, and that in every well-cultivated farm there will be a considerable quantity imported in cattle food, there can be little doubt that, under ordinary circumstances, the alkalies accumulate in the soil. It may be further remarked, that in our experiments the alkalies, in whatever form we applied them, were always injurious to the vigorous growth of the young plant. Although the export of phosphate of lime from a farm is very much larger than that of the alkalies, the continual use of it as a manure for the turnip crop could not be advocated upon the ground of mere exhaustion; for it could be proved that where the supply of it to the turnip-crop during successive years has been much greater than what has been removed in produce, the effects of further applications were equally successful.

We are therefore inclined to limit the economical application of mineral manures to phosphate of lime alone, and even then in most cases it is employed not as an element of which the soil is deficient, but as an agent for promoting to a remarkable degree the early and vigorous develop-

* This *retention upon the farm of nitrogen specially* demands more notice than our space permits.

ment of the young plant, and carrying it with rapidity over those stages, any delay in which is attended with great injury, and often with the destruction of the whole crop. The sources of phosphate of lime are guano, bones, and the compound of bones and sulphuric acid, called superphosphate of lime. The latter manure is the form which is found to produce the greatest effect upon the young plant, and especially upon the development of a large amount of fibrous roots. Although strongly acid, it may be drilled with the seed without the slightest injury to it. It must, however, be clearly understood that the bulk of an agricultural crop of turnips depends materially upon the amount of organic matter contained in the soil, without which the development of the power of growth by means of the phosphate will be unavailing. The first application of a mineral phosphate is liable to produce heavier crops of turnips than those which follow, unless the carbonaceous matter taken from the soil by the turnips, and lost by the respiration of the stock consuming them, has been made up by imported cattle food. Rape-cake, as containing a large amount of organic matter, is an admirable manure for the turnip as a substitute for farm-yard dung; it may be employed in conjunction with superphosphate of lime—the former being sown broadcast, and the latter drilled with the seed. Peruvian guano, which contains a large quantity of ammonia as well as phosphates, is found to be a much more certain manure for turnips in Scotland, where the fall of rain is large, than in those parts of England where it is much less. Indeed the natural agencies of *season* are much more favourable to the growth of turnips in Scotland and the north and west of England than in the eastern counties, where the application of skill and capital, upon a soil well suited to the plant, has gained for them a high reputation. In the south of England, and wherever the comparatively small amount of rain that falls renders the production of the turnip-crop uncertain, the cultivation of the mangold-wurzel might be extended with considerable advantage: it can be sown sufficiently early in the spring to enable it to extend its roots deep in the soil before the dry weather sets in; it is not liable to injury from insects, and is capable of producing a larger amount of solid food than any other crop in a rotation. The objection raised against it as an exhausting crop arises partly from the small amount of produce which it yields from a given weight of manure compared with turnips; but as the per-centage of dry matter is greater, the objection may not be valid. The following table shows the amount of dry matter contained in various root-crops grown this season upon Rothamsted Farm under ordinary cultivation:—

Per-centage of dry matter in		Long Red Mangold-wurzel ..	12.7
ditto,	ditto,	Yellow Globe do.	11.34
ditto,	ditto,	Common Swede (name unknown)	12.2
ditto,	ditto,	Skirving's Swede, purple top	9.4
ditto,	ditto,	Skirving's Swede, green top	9.4
ditto,	ditto,	Green common Turnip	7.9
ditto,	ditto,	Norfolk White ..	8.83

We see by this table that 10 tons of mangold-wurzel contain as much dry matter as 15 tons of white turnips, and that the difference in bulk between a crop of Skirving's, compared with one of the older sorts of swedes, is due to the difference in the proportion of the water. That the soil on this farm, although not a turnip soil, is capable of producing good root-crops, *under a proper supply of manure*, may be inferred from the fact that this year, which is anything but a good turnip season, an acre of swedes were weighed, the bulbs of which gave 20 tons 10 cwt. Number of plants per acre, 20,120: average weight, 2 lbs. 3 oz. Ten of the largest were found to weigh 112 lbs.

We found in our experiments that the usual per-centage of nitrogen could be nearly doubled by the use of ammoniacal manures; but we do not recommend the general *direct* use of such manures for turnips, notwithstanding that the value of our produce as food depends much upon the per-centage of nitrogen it contains.

On some future occasion we shall endeavour to show that, excepting rape-cake, the manures in the market containing nitrogen are more advantageously employed for clover, and other crops of the like kind, than in any other place in the rotation.

If a proper quantity of imported food be consumed upon a farm, the direct supply of nitrogen to the turnip crop by means of artificial manures will certainly not be necessary. An *excess* of nitrogen in the soil produces too large a proportion of leaf, and too little tendency to form bulb. It is true that a crop of turnips having a large proportion of leaf will give a larger amount of manure to the land; but its yield of food will be comparatively small. But, since the manure obtained in such a case previously existed in the soil, the economy of the crop, even so far as its manuring influence is concerned, may be doubted. In fact, so far as our experiments upon this subject enables us to judge, we believe that where the supply of nitrogen to the soil is very great, the amount of it collected from the atmosphere is less, and thus a part of the benefit of the crop would be lost. All the specimens in which we found a high per-

centage of nitrogen were those in which there was a great development of leaf with a comparatively small tendency to form bulb; and we believe that the high per-centage was due to a deficient accumulation of carbon by the plant. Whilst, then, a high per-centage of nitrogen may indicate an abundance of it in the soil, the growth of the plant has been in other respects defective. It is probable that the full-grown bulb of such a plant as has only a due proportion of leaf will seldom have a per-centage of nitrogen much higher than that which has been usually observed; for with an increased supply of nitrogen there is an excessive production of leaf, and a bulb which, though richer in nitrogen, is not profitably developed. There is, however, a casual advantage in having a somewhat full supply of nitrogen in the soil for those of our turnips which are to be eaten late in the season; for the plants so grown, whilst they may have a less favourable proportion of bulb, yet, owing to the increased vitality and hardiness which result from the nitrogenous manure, the bulb is better fitted to stand the winter temperature without injury. A sufficient importation of food for stock will, however, render the purchase of nitrogenous manures for the turnip crop quite unnecessary; but where such manures are employed, rape-cake will be found to afford a sufficient, and in other respects the most advantageous, means of supply.

Lastly, it must not be forgotten that the tillage of the soil constitutes a most essential element in turnip culture; and that he who sows his turnip-seed upon a badly-cultivated soil is only throwing away his time and money. The naturally light and porous nature of a *turnip soil* points out what are the requirements of these plants; and when the necessary degree of tilth has been obtained, and the seed sown, the introduction of air beneath the surface of the soil by means of the horse and hand-hoe cannot be too frequent; for it is useless to place a large amount of dung in the soil to be converted into the substance of the turnip, unless the free action of the air is provided for at the same time, by which alone the decomposition of the dung can be effected. J. B. Lawes.

Rothamsted, November, 1847.

Note.—In placing my name to this article I must observe that whatever merit may be assigned to it is mainly due to the skill and talents of Dr. Gilbert, upon whom the responsibility attending the investigation has devolved. Those who have endeavoured to conduct with accuracy only a few experiments in agriculture will be capable of forming some estimate of the labour which so extensive a series requires.—J. B. L.

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

The usual monthly meeting for discussion was held at the Club Rooms, New Bridge-street, Blackfriars, on Monday, April 3, W. Shaw, Esq. (London), in the chair. Owing to a cause referred to by the Chairman, the attendance was smaller than usual. The subject for discussion was, "The importance of union between landlord and tenant, to develop the resources of British husbandry."

The Chairman said: Although I am not surprised, I cannot refrain from expressing my regret, that on an occasion when so important a question is to be discussed, the attendance should be so small. I say I am not surprised at this. We all know very well how much the country has been in want of that fine weather with which we are now happily blessed; and we can hardly expect that farmers, who have a large stake engaged in the object of their daily pursuits, should neglect practice, to come here and study something of a more abstract character, and the benefit of which appears more remote than attention to their immediate and daily avocations. But, be that as it may, happily there are means by which sound principles, even if they emanate from a garret in this great metropolis, may be extended throughout the country at large (Hear, hear); and therefore, although our numbers are small, yet if we are intelligent enough to place on record that which is of value, we may rest satisfied that what we utter will be widely promulgated (Hear, hear). The subject for discussion this evening is one which I conceive to be of paramount importance. I have no doubt that the question will be regarded here in different points of view (Hear, hear). There may be those present who will adhere to the opinion so long entertained, that something like a patriarchal feeling should exist between landlord and tenant; that the tenantry should be considered as coming almost within the family of the landlord; and that in treating with his tenants, he should regard them as branches of his family. I can readily imagine others taking a different view of the question. There are some men in the present day—I do not say whether they are right or wrong—who consider that the relation which exists between landlord and tenant is a mere question of contract between the two parties; each of whom should have certain defined rights, and that neither should pass over the line. What course my friend on my right (Mr. Smith) will take, I do not know; but of this I feel perfectly satisfied, that having been himself distinguished as a practical farmer even among practical farmers, and having also attained a literary celebrity by being the author of one of the prize essays of the Royal Agricultural Society, he is fully qualified for the task he has undertaken (Hear, hear). I must add, as another qualification, the circumstance of his having lived on the confines of a county where the relations

between landlord and tenant have been developed in a most peculiar manner. And never could the question for discussion have been placed in his hands more happily or appropriately than at the present moment, when he is about to remove from his present occupation to undertake the management of an extensive estate, where, with information previously obtained, with that sound judgment which he has ever evinced, and acting on those practical principles in which he has been brought up, he may be instrumental in showing an example of the satisfactory relation in which landlord and tenant should be placed to each other (Hear, hear). I congratulate him on the position which he is about to assume, because it will afford him an opportunity of effecting that which is nearest and dearest to his heart, as a farmer, namely, establishing so far as it shall be in his power to do so, sound, just, and beneficial relations between landlord and tenant.

Mr. R. Smith said: In rising to bring under the notice of the club "The importance of union between landlord and tenant to develop the resources of British husbandry," I need make no apology, as the subject is one of both rural and national importance, and upon which depends the prosperity of future ages; and is a subject, I feel convinced, that is uppermost in the hearts of the members of this club, and will, I trust, be responded to with that zeal that has hitherto marked your steady but onward progress; and which, I delight to say (as predicted by your Chairman), has already cast its light into the shade of every rural district. And while it is important that we should meet each other in this room to discuss and exchange ideas upon this, the leading subject of the day, it is a pleasing reflection to find the local farmers' clubs of England, the true representatives of the producing districts, united with us in a desire to advance the agriculture of our country. The opinions expressed at the various agricultural meetings form another proof of the importance of bringing this subject before the country in its present proposed form for discussion, being a subject of extensive moment, and connected more or less with every operation of the farm, as, according to the strength or bond of union that exists between landlord and tenant, so goes on the improved culture of the estate, employment of capital, employment of labour, and increased production of food for the people. Before proceeding to the general question, I am desirous to add, that in bringing this subject before the meeting, I have been alone prompted by my desire to aid the cause of our native agriculture, and to point out the national importance of a speedy and united movement to develop its resources. Among the more general operations of agriculture, and which require to be accurately and substantially performed to insure success, are the subjects of draining, building, fencing, the removing of hedgerow timber, the breaking up of inferior grass-lands, the reclaiming of wastes and open commons, the improvement of water-courses, irrigation, roads, farm cottages, &c., to which I will briefly allude, as they cannot be performed in a masterly style without the union of landlord and tenant; as, in the absence of the landlord performing the permanent improvements of the farm, and charging a proper per centage upon his investment, steps should be taken to induce the tenant to supply the requisite means (of skill and capital), by allowing him to reap the benefits of his outlay. Hence, in the absence of such union, we find numberless fields stagnant with water, thrown off alone by evaporation, to the exclusion of the free and powerful elements of nature supplied for its use, to produce the food of man. Numberless buildings in a dilapidated state, standing alone as dejected monuments to record the wretched custom of uncertain tenure. But how different is the appearance of the farmsteads in those districts in North Lincolnshire where the established custom of the country, or union of interest, has shown its lights, even to the exclusion of the Dunster-pillar, which once lighted the weary traveller over the then neglected rabbit warren. Again, if we traverse those districts in Scotland which have been reclaimed under a bond of union, in place of the dreary buildings upon neglected farms, we find the model homestead, and the steam-engine with its tall chimney stretching to the sky, as a beacon to light the yet onward progress of the Lothians. If we turn to the county of Norfolk, where a union of interest has long and happily existed, we find the same perfection to exist; and that, with their spacious buildings, the whole manufacture of food for the people is conducted with the same cleanliness and exactness of manufacture as adopted in the production of clothing in the manufacturing districts; hence arises their immense weight of food, supplied to the London markets. I could wish that a similar union of interest between landlord and tenant pervaded the whole empire, and which it would be easy to accomplish if the landlords of England would more generally meet the enterprising tenantry of our country, by giving them a guarantee against the vicissitudes of uncertain tenure. The laying out of equitable fields, the straightening of fences, the removal of hedgerow timber, are also important points to be adjusted, and may readily be accomplished by a union of interest. The importance of breaking up inferior grass lands is a subject but little understood, at the present, by the landlord, and requires to be noticed; as, from the knowledge I have of the subject, I am convinced that immense results follow the judicious application of the plough to certain inferior soils, by which means the whole arable part of the farm shares in the increased manure thus afforded; hence supplies more food for our increasing population, gives increased employment to the agricultural labourer and artisan, and, lastly, improves the farm for letting to a future tenant many shillings per acre. As, while poor grass-land is the bane of a farm, new arable land is an acquisition. In fact, the straw grown upon some lands after breaking up, is worth more than the herbage when in previous grass. But in thus recommending the breaking up of certain grass-lands as an acquisition to the farms, I must beg distinctly to state, that it should alone be granted to those tenants whose farms are in a healthy state of cultivation, and thus require more employment; but in no instance to those parties that merely ask the favour, that they may linger on a little longer in their already neglected occu-

pation. The reclaiming of open districts and commons is a subject of national importance, and is profitably accomplished by liberal leases, as adopted by the late Earl of Leicester in reclaiming the Norfolk sands. The improvement of water-courses, roads, and irrigation, when performed by the tenant, is another proof of the importance of giving protection to the investment of capital. And though last, not least, I may mention the immense results that would follow, by the increased demand for labour, and consequent reduction of the poor-rates, as also the moral condition of the whole district improved. Another feature of importance occurs in the economy of manual labour, by having the labourers located upon the farms, which is readily accomplished by the tenant paying the landlord a per centage on the outlay for building cottages, or by security to the tenant when he is required to build them; but in either case the landlord should allow the tenant full control over them, or in time they might possibly become the greatest pests of the occupation. In thus detailing the leading movements of the farm as briefly as possible, it leads me to the real position of the subject under discussion, as in every instance it is shown that upon a union of interest between landlord and tenant hinges the increased productions of the soil; and from the practical knowledge I have had of the various customs of tenure throughout the country, I am prepared to show that such union is strength, and that it is best supported and carried out by long leases, or security for unexhausted improvements; under which agriculture has made rapid strides, tenants have flourished, and the property of the landlord doubled in many instances; in support of which I would for a moment direct your attention again to the county of Norfolk, where, by the union of landlord and tenant, under long and liberal leases, the blowing sands of Norfolk have become rich and fertile fields; and the result in both a rural and national point of view is apparent to the common observer, as we frequently notice the majority of the cattle supplies in Smithfield market quoted under the head of Norfolks. Again, under the security of tenure practised in the North of Lincolnshire, we find not only the rabbit-warren and heath converted into splendid arable fields, but that the barren and neglected hills of the Wolds have also been brought into the highest possible state of cultivation; and that while they abound in abundance of corn, and supply the greatest weight of mutton per acre of any district in England, the whole has been successfully accomplished under "security for unexhausted improvements," or what is commonly called "tenant's rights;" and I may venture a remark (which is of the utmost consequence), that the whole has been accomplished without the landlord scarce knowing what has been going on, beyond the daily improved appearance of his estate, and that while on the one hand it has cost him nothing, beyond the nominal guarantee, the estate has been improved by the tenant's capital at least 300 per cent. Again, how often has our attention been drawn to the agriculture of Scotland, and more particularly to that of the Lothians, as examples of what may be done by skill and enterprise! and while the English farms present so irregular a form of husbandry, in Scotland is found a whole district of country managed as though it was one farm. A stronger case cannot be given in support of our subject, as the whole beauty of the Lothians is produced by a union of landlord and tenant; their system being that of long leases, under which agriculture has climbed to the hill-top, the temperature and beauty of the district improved, and the tenantry free to display their talent and enterprise, are found in a healthy condition, as fully supported by my correspondence with Mr. Douglas, of East Lothian, who very ably points out the necessity of security for unexhausted improvements, and clearly defines every duty of both landlord, tenant, and labourer, which, with your permission, I will lay before you:—

"I think you have proposed a subject for discussion of vast importance, not only to those immediately concerned, but to the public.

"The necessity and importance of union between landlord and tenant, to develop the resources of British husbandry, must be apparent to every mind possessed of common feeling and observation; but especially to those more immediately connected with the cultivation of the soil; they at least view this relation to be of great importance. For it is easy to conceive that if interest and sympathy do not exist between landlord and tenant, all the benefits to be derived from the connection are lost, not only to the tenant and his servants, but to the public at large; if the combined efforts of landlord and tenant are brought to bear upon the thorough and most profitable cultivation of the soil, an end will be attained, which in the first place will benefit all immediately concerned, and ultimately all classes.

"The parties immediately interested in developing the resources of agriculture to the very utmost are the landlord, the tenant, and the labourer; these three classes are, therefore, the agents upon whom the thorough cultivation of the soil depends. The landlord, by co-operation, gets his estate improved and beautified, the tenant's means are increased, and the labourer's moral and social condition improved.

"I will now state to you, as briefly as possible, my humble opinion what the union ought to be between landlord and tenant; embracing, in the first place, the duty of the landlord—

"First—A liberal lease should be granted, divested of all unnecessary restrictions as to cropping, &c.; it being understood and acted upon by both, that the most judicious and profitable cropping is for their mutual benefit.

"Secondly—In the letting of a farm the proprietor should not bind himself to accept of the highest offer, but should leave it to himself to accept of one who is most likely to carry on the farm with advantage to the fullest extent, having character, practical experience, and ability to take it—that is, sufficient funds to enable him to manage the farm with ease and advantage.

"Thirdly—The landlord should sufficiently fence and subdivide the farm into suitable enclosures for the size of it, preferring walls where stones can be conveniently got, as being better shelter, more efficient and durable, and the least expensive to maintain, at the same time lodging no vermin to the destruction of the crops. He should also maintain the one-half of all fences during the currency of the lease.

"Fourthly—The buildings should be conveniently placed, and to the fullest extent necessary for the most profitable management of the farm. A steam or water power thrashing ma-

chine should be included, also proper accommodation for servants.

"Fifthly—A sum sufficient to thorough-drain the farm should be advanced; the tenant driving the carriages, and paying five per cent. on the outlay; all other necessary permanent improvements, such as roads, &c., to be done entirely by him.

"Sixthly—The landlord's duty should be, in a word, to encourage and assist the farmer in every reasonable way, and not by any means to weaken his hands or withhold his support.

"We now come to the duty of the tenant, and the means at his command for increasing the productive powers of the soil.

"First—In consideration that he has received from the proprietor a liberal lease, he is not by any means to abuse that privilege; but to exercise it in the spirit it was given, and the way to obtain the object for which it was intended.

"Secondly—It is the duty of every prudent tenant not to attempt to rent a farm, the extent of which makes his funds inadequate to the profitable management of the same. The tenant should maintain the one-half of fences, and be at the expence of the repairs of buildings during the currency of the lease.

"Thirdly—The means at his command for increasing the productive powers of the soil should be exerted and followed up to the fullest extent, viz., by supplying the soil with those substances which it may be most in want of—such as manures possessing different properties, lime, and other substances which may be required; also by altering its texture, depth, and properties, by tillage and other means; changing its relation with respect to moisture, by drainage, and also with respect to temperature by the same means; artificial manures, fencing, and plantation.

"I have stated what occurs to me should be the understanding between the landlord and tenant, to enable both properly to carry out the object contemplated; but there are other causes which operate greatly against the development of the resources of the soil. First, the law of entail. Under this law, wide tracts of country remain unimproved, which would not otherwise be the case. This entail system abolished, the landlord would find himself in a position to join in union with the tenant to farm the land to the best possible advantage. Secondly, the law of hypothic gives great and unequal advantages of security over all other creditors to the proprietor of lands in the farmer's case. This privilege upholds the rack-rent system; so long as some proprietors get the promise of a high rent—that is, a rent that they know (not unfrequently) to be more than the value of the lands—they will let their farms at a rack-rent to individuals who have not sufficient capital to carry on the farm, and very likely without either the practice or skill. They reason to themselves in this way—that the party will at all events be able to stock it, and that the law of hypothic will secure the rent. This system of *fleecing* is carried on to a great extent, to the injury of the country at large. But were this law also abolished, landlords would select their tenants in the way I have already noticed; and instead of fleecing one tenant after another, they would have thriving tenants, giving them no trouble, and raising more food by the judicious and profitable occupation of the soil.

"The abundance of game is another cause against the development of British husbandry, and sufficiently calculated to interrupt, and perhaps sever, the union between landlord and tenant.

"In conclusion, I have only to express my fixed opinion that the 'Union of Landlord and Tenant' is of such vital importance that each party is called upon to cement and continue it so far as he is concerned, and that to the very utmost.

"The Lothians (and indeed all Scotland), previous to the year 1765, were very much neglected, and the cultivation of them was in a very backward state; between this period and 1775 a decided spirit of improvement seems to have commenced. Leases were granted, and not unfrequently improvements were made at the mutual expense of both parties. The system of granting leases may be looked upon as the first and most important step taken towards facilitating the improvement of land. Without a lease, how can it be expected that the land will be improved or the country beautified? or what security will a tenant have for his outlay and waste of time when it is well known by every person connected with agriculture that it requires eight years of possession before the party can go over it all with green crops, and be sufficiently rested and renewed before he can receive the reward of his improved cultivation? It must at the same time be evident that a tenant in *yearly* possession will never attempt any such thorough improvement, when, in the midst of his career, he may be interrupted by a *six months' warning*, and the fruits of his improvements be transferred to another.

"It is not enough that a lease should be granted securing uninterrupted possession for a number of years certain, but that liberal conditions and encouragement be also given to the judicious improvements of the land; and that no severe or unnecessary restrictions be contained therein, otherwise it will ultimately be of little avail towards forwarding the improvement of the subject. To quote the words of Brown, on "Rural Affairs," speaking of leases, he says—'Proprietors who grant leases, and include in them covenants or obligations that obstruct the operations of the farmer, or, which is the same thing, prevent him from raising the greatest possible quantity of produce for the use of the community, must be regarded as enemies of the public welfare. If agriculture is a main pillar of the state, every measure tending to injure or reduce its strength must be considered as hostile to the community, and deserving of the severest censure and reprobation.'

"Nineteen-year leases are, and have been for a very long period back, universal in the Lothians, and I believe the principal cause of their present high state of cultivation."

Let us now turn to that numerous class of tenantry who hold under uncertain tenure, and if we except the leading nobility, and the fine old English gentleman class of landlord, we find the situation of such tenantry anything but a "bed of roses;" and even under the best of landlords, life is precarious, and it then becomes a speculation, in too many instances, as to the future. Again, some slight difference with the agent, the disturbance of game, or other trivial cause, might lead to the immediate discharge (at the end of six months) of a principal and valuable tenant; and possibly, at a moment when the tenant had *invested* the bulk of his property in the soil, and thus cast upon the wide world with his reduced capital. With this class of tenants it too frequently occurs that in the *absence* of a union of interest, we find the property in a most neglected state; hence the first bad season that comes, the landlord has his farm thrown upon his hands: not so with those farms let upon the principle of giving "security for unexhausted improvements" as we rarely or ever find *them* even offered for public competition, but much sought after on account of their healthy state of cultivation, it being found far more desirable to enter upon a farm where you can at once realize good crops, than to spend at least from four to six years of a life in redeeming that which, during the past

four or six years, had been gradually taken out of it! Again—scarcely ever was a landlord known to be asked for the amount or claim of the outgoing tenant for unexhausted improvements, the competition for this class of farms having so generally increased. Picture the feelings of a man of talent, who has to linger on in an occupation of *uncertain* tenure, crippled at every movement to advance the produce of his farm, and is compelled to bear the epithets of his neighbours and passers by, who denounce him as a bad farmer, although they are free to admit that he is a man of talent. Yet even upon such occupations, the *law* protects the landlord against all dilapidations, but *not* the tenant for his unexhausted improvements; hence the growing and determined desire by the tenantry to have even-handed justice done them, and that they may no longer be exposed to both the law of dilapidations, and the uncertainty of a six months' notice to quit, without receiving on the other hand a guarantee for their unexhausted improvements. But mark the effect of a tenant's feelings under "security of tenure." Instead of being checked, and compelled to restrain his talent at every point of improvement, he becomes a free man—free to think, free to invest, free to carry out new designs, and lastly, free to cultivate his lands upon those improved principles he has long admired upon the farm of his neighbour, who has had the good fortune to enjoy security of tenure. But when I reflect upon the *past* important union between landlord and tenant, to protect the native husbandry of our country against the inroads of foreigners, and that the tenantry of England were cast upon their own resources to meet the comparatively free grown produce of foreign countries, I cannot but hope that the same national zeal which prompted *that* union will aid us in the development of British husbandry. But, sir, however rural may be the habits, and however loyal may be the hearts of the tenantry and yeomen of England, they have seen with regret, and marked with silent indignation, the course that has been pursued by a majority of our legislators in direct opposition to their interests; and it will not require the aid of the political economist to show that under the export of millions of British sovereigns for foreign corn, our native agriculture must eventually be depressed, and that a rapidly increasing population is daily treading upon our heels for an increased supply of food: hence follows the absolute necessity of a speedy but healthy union of landlord and tenant, to develop the yet hidden resources of our *native* soil.

Mr. Beadell said: Sir, I have listened attentively to the essay which Mr. Smith has read to the club. In that essay he has pointed out a great many duties which the landlords ought to perform, and which I have no doubt a great many of them are very willing to perform. But I think he has left one question relating to the landlord untouched, and that is the question what the landlord is to do when he gets, not an improving tenant, but a very bad one (Hear, hear). Giving to the tenants of the United Kingdom the full credit to which they are entitled for their general conduct—believing them to be, as a body, an intelligent and improving class of men—still I have, in the course of my experience, met with a bad tenant, and I should like to hear what the landlord is to do when he has the misfortune to have a tenant of that description. In all these matters we must endeavour to hold the scales evenly. Whatever we ask for ourselves as tenant-farmers, we must take care not to ask it to the prejudice of the landlords (Hear, hear). While it may be quite right that we should come here and point out to landlords what they ought to do, before we ask them to do everything, we ought, I think, to point out to them some remedy which they may apply when bad tenants get possession of their farms, and conduct themselves, as they frequently do, very improperly.

Mr. Walton: Do you speak of tenants under lease?

Mr. Beadell: Tenants under lease, and tenants from year to year: I have known both to misconduct themselves.

Mr. Godwin: Sir, I think the question which has been put answers itself. I am one of those who think that if the question under consideration were settled, it is not the tenant farmer, but the landlord, the labourer, and the consuming public who would reap the greater portion of the benefit. Supposing tenant-right to prevail throughout the length and breadth of the land, there would be an enormous investment of capital, and this would, according to the result in analogous cases, lead to a great increase of produce. This produce would be brought into the market to be sold at the market price; and whatever price might be obtained, still the expenditure would have been incurred, the labourers would have been employed, the landlord's property would have been improved without the tenant farmer having secured to him a return for his outlay. As regards the question, then, just proposed: What is the landlord to do with a bad tenant? I imagine that, supposing the tenant-right question to be settled, you would not find such a tenant, because it would require a large amount of capital to enter upon a farm. Although there has of late years been an advance made in this respect, we still frequently see persons taking land who have neither intelligence nor capital to assist in its cultivation. Probably the reason why this so frequently occurs is because the full amount of his responsibility is not at once shown to the tenant. If tenants were required to put down the full, or even the greater part of the amount that would be eventually required to carry on the work of cultivation, we should see very few men bidding for farms without having capital to cultivate their property.

Mr. W. F. Hobbs said: I need not tell the Club that I have always felt it to be of the utmost importance that a greater union should exist between landlord and tenant than is found prevailing throughout the kingdom. I feel also persuaded that when Mr. Beadell proposed the question which he did, he did so rather with a view of eliciting information on that subject, than from any interested motives as against the tenant farmers of England (Hear, hear). I know him too well to suppose that he imagines that either we this Club, or the tenant farmers of England generally, were at all desirous of obtaining advantages in which landlords are not to participate (Hear, hear). I am very much pleased that he

has put the question, for it is one of importance to both parties; and I feel persuaded that this Club will never take up any question the result of which will not be as advantageous to the landlord as to the tenant farmer (Hear, hear). Mr. Beadell has asked, What would be the landlord's position if he were annoyed by having on his estate an unimproving tenant? I consider that the landlord has two positions to take. In the first place, if he be not in the habit of giving leases, he has that duty still to perform towards his country (Hear, hear). I consider that all property has its duties as well as its rights (Hear, hear). All landed proprietors have certain duties to perform. I hold that it is the landlord's first duty, as well as his interest, to take care to do ample justice to his tenant; and if the tenant be a bad one, cultivating the land with injury to the estate and to the public, it is his duty to himself and to the country to get rid of him as soon as possible. When the landlord gives security to the tenant by means of leases, I think he has a right to secure himself against unimproving tenants by that sort of covenant which will protect him from injury. Whilst it is the duty of the landlord to grant liberal covenants with a view of promoting improvement, it is his duty also to protect himself against the tenant who has neither inclination, capital, nor skill to cultivate the land in the manner in which it ought to be cultivated, and only in a narrow-minded way, to the injury of the labourers and of the country. I was very much pleased to hear some of the remarks which fell from Mr. Smith, and more especially those which had reference to the Lothians. He told us that a Lothian farmer asked, What can a tenant farmer do without a lease? How can the land be improved, or the country beautified? Now, it is well known that in England leases are not the rule, but the exception. It is well known that a great portion of the land of England is held without any security whatever; not only without leases, but without any tenant-right. I do not wish to enter into the tenant-right question this evening; but I do think it of importance that we, as practical men, should whenever we have an opportunity, do all we possibly can to promote union between landlord and tenant. I can only account for the fact of the landlords' not having come forward more than they have done by supposing that they are influenced by a mistaken pride with regard to mixing with the tenantry of this kingdom (Hear, hear). If we look at the merchants; if we look at the leading bankers and leading men connected with the trade and commerce of the country, we find that such classes, however great their wealth, do not consider it beneath their position in life to make themselves acquainted with all the details and operations of their business; but we too frequently, and indeed almost universally, find that the landlord does not at all acquaint himself with his tenantry and their position. I am glad to hear that in some parts of the kingdom an improvement is taking place in this respect. I have been told, for example, that in the north of England a nobleman, possessing vast estates, considered it his duty as soon as he came into possession to go through the estate, and to mix with his tenantry, in order that he might acquaint himself with their wishes, and meet their requirements (Hear, hear). I feel persuaded that if the landlords of England as a body would imitate this example, instead of entrusting the management of their estates, as they too frequently do, to professional gentlemen in the metropolis and other leading towns of the kingdom; if they would endeavour to make themselves more acquainted with the wants of their tenantry and the improved practice of agriculture, we should see a greater bond of union between landlord and tenant than exists at the present day (Hear, hear). The nobleman to whom I have just referred is no other than his Grace the Duke of Northumberland (Cheers). That noble peer, as soon as he came into possession of his estate, made it his business to go from farm to farm inquiring as to the wants of his tenantry, and meeting their views with regard to agricultural improvements (Hear, hear). He is, I doubt not, prepared to set an example in that part of the country, which will have an influence, and be productive of vast benefit, throughout the kingdom. I need not refer at any length to what fell from Mr. Smith with respect to the improvements in the county of Norfolk. In that county there is a striking example of a bond of union between landlord and tenant having existed for many years. I have been given to understand that there are two large estates in the county of Norfolk, which have been very differently circumstanced within the last thirty or thirty-five years. On one of these estates, that of Lord Leicester, a union has subsisted between landlord and tenant, very much to the advantage of the tenantry, of the labourers, of the trade of the district, and of the community at large; and when I tell you that that estate has more than quadrupled in value, in consequence of the enjoyment of security by the tenant, you will feel that it ought to be a lesson to landlords, that if they encourage their tenantry in acts of improvement, such conduct will prove quite as much to their own advantage as to that of the tenantry (A voice, "More!") Now, there is another large estate in the same county, where, as I understand, no union has subsisted between landlord and tenant. Until within the last five or six years that estate always stood in the same position; the tenantry being for the most part what we term "leather-jacket men," having never got out of that semi-feudal system which in former days all landlords liked to adopt towards their tenants. Under such a state of things the tenantry could not advance with the times, the landlord did not receive from his land the full benefit which it was capable of yielding, and the poor remained in a degraded condition. Now, within the last few years, through the advice of a new agent, the owner has been giving security for the investment of capital by means of tenant-right; and I may just inform you that although that security has existed only for a short time, the produce of the soil has increased five-and-twenty per cent. I feel persuaded that if the landlords of this country would examine into the matter, and ascertain the wants and wishes of their tenantry, they would find that there is no desire on the part of the tenantry to deprive them of any one power which they have a right justly and fairly

to possess. All that they want is to improve the land, to employ labourers, and, in doing so, reserve a just proportion of remuneration for themselves. There are undoubtedly cases in which landlords are aggrieved by the conduct of their tenants; but while they may be annoyed for a short period by a troublesome tenant, I think it is their duty to give to every tenant a fair chance, and if he does not use his opportunity rightly, to put a better man in his place (Hear, hear).

Mr. Aitcheson: Having been a member of the Farmers' Club from the commencement of its career up to the present time, I must say that I think we have kept this subject in abeyance for a considerable period. I am sorry to be obliged to differ from many members of the club with regard to leases. I think we ought to look at the matter in a broad point of view. What we want, I consider, is, not a system of leases, but a tenant-right, based upon principles by which a yearly tenant would stand in as good a position as the man who has a lease similar to that which is given in the Lothians. I cannot but think that the whole matter might be reduced to a very simple principle. If I visit a farm, and am told what I should have to pay, and see what I should have to do, I proceed with my eyes open, and it is my business to judge whether my means and capacity would justify me in entering into possession. The landlord, or his agent, has an equal power of examining into my qualifications, ascertaining who and what I am, where I have been before, and how I have been employed. Now, I would proceed upon the widest basis. I would give the landlord the greatest possible advantage as regards that which is his own, and at the same time I would give the in-going tenant a perfect knowledge of what he was about to undertake, what he had to do, and what to expect. The landlord and tenant would then meet on equal terms. We know, however, that two-thirds of the land throughout England—owing to various circumstances into which I need not enter, because they must be obvious to the mind of every one present—two thirds of the land, I say, cannot be let on lease. As, then, we cannot have leases throughout England, Ireland, and Scotland, we must do the best we can to secure without them a better system of tenure. No system of tenant-right can ever be effectual unless the points which I have mentioned are fully settled. I contend that tenant-right is not the same thing as the question of leasing. If I enter upon a farm at Michaelmas, and the landlord has to give me 12 months' notice, I hold the farm for two years: a sufficiently long period is thus allowed to enable the tenant to look round and suit himself with another farm, in case he has to remove; and tenant-right should be based upon the principle that if he improved the land during his two years' occupation, he shall receive in proportion on going out. That is the true principle of tenant-right. In my opinion leases have but little to do with compensation for improvements. I would never base a tenant-right bill on the principle of leases, because if it be thus based it must fail before the legislature. It is impossible that those who may only hold themselves for a year, or tenants for life, can grant leases. The system which we ought to seek to establish throughout Great Britain is that of having a fixed principle on which a man enters upon, and on which he leaves a farm; and no other principle, in my opinion, would you ever obtain a legislative enactment. I would suggest that for the purpose of arranging this matter, there should be a committee chosen—I care not whether by the House of Peers, the House of Commons, or the Farmers' Club—composed of 7, 11, or 13 of the most suitable men for dealing with such a subject; that there should be an equal proportion of landlords, land-agents, and practical tenant-farmers; and that this committee should be called upon to propose a system on which land should be entered and left. I care not twopence for a lease; but I do wish to see a system laid down, under which a tenant entering upon possession at Michaelmas 1848, and going out at Michaelmas 1850, would be paid for all improvements which he might have made during his possession. I think we should not insist upon leases, because they can never prevail uniformly throughout Great Britain; and I repeat my conviction that any tenant-right bill which is based upon that principle will fail when it comes before the Legislature.

Mr. Walton said: I agree with the last speaker in much which he has said on the subject of leases. Although I have a lease myself, its only value is that of preventing the landlord from turning me out in consequence of any pique or caprice which he might possibly have against me. As regards leases generally, I think they are of no avail whatever, at least without being accompanied by tenant-right. Payment for improvements would benefit all parties much more than the mere existence of leases: especially would it benefit the community at large, who cannot otherwise have that quantity of corn from an estate which it ought to produce. As regards the observation about a bad tenant, I think that if the improvements effected had to be paid for, that would at least afford a guarantee to the landlord that the incoming tenant had sufficient capital to employ on the farm. It is often necessary to guard against the case of an incoming tenant not being a sufficiently responsible man: here there would be security for a certain amount of responsibility (Hear, hear). If the law of preference were done away, landlords would then take more pains in inquiring into the character of in-coming tenants. I never knew a corn-farm so badly cultivated but that at the end of the harvest the landlord had sufficient to secure himself (expressions of dissent). I hold one thousand acres in Hampshire, and I defy any one to prevent the landlord from putting his paw on sufficient for the purpose. Now if the law of preference were abolished, the landlord would take more pains in selecting his tenants. As regards leases, I may mention that about two years ago a neighbour of mine took a lease of 14 years, properly and fairly signed by his landlord. Six months ago the landlord died; and though the tenant had laid out a considerable sum, he has now got six months' notice to quit (Hear, hear). It may appear dishonest to have granted, or advised the granting, of such a lease; but the fact is as I have stated, and I met my friend going, the other day, to apply for another farm (Hear, hear).

The Rev. Mr. WARREN said: I did not intend to address the meeting. I must say, however, that I feel interested in the question, which sounds remarkably well in theory; and I should be very glad to see the spirit of it carried out. But I think the whole matter is surrounded with very great difficulty. Both landlords and tenants appear to me to be in a similar position to members of Parliament, of whom it has been said that they have much to learn, and that they ought to go to school. As a Club, we have a good deal to learn before we can lay down a rule by which equal justice may be done to both parties (Hear, hear). I have had but a few years' experience in farming. During that period it has been my fortune to meet with one or two very good tenants; but it has also been my misfortune to meet with some very bad ones, who occupied very superior land. There was one tenant in particular, whose father had made a fortune off the land, and who knew that I wanted to get rid of him. Now this tenant exercised the sort of pique which has been attributed to landlords. I may be allowed to suppose that tenants may have piques as well as landlords; and in this case I can only say that on first-rate land, in the year in which he went out, he directed his harvest men to reap round the docks, that they might seed the land. I had the information from a man who was engaged in reaping. In the fifth year after this tenant quitted the farm, there were still signs of docks. There ought, I think, to be a law to prevent any man from committing such an injustice; an injustice, which in this case, was not committed against me, but against the whole country (Hear, hear). It appears to me that our grand object, as farmers, should be to raise an increased amount of produce, so as to meet the demands of the people, and give them a sufficient supply of that food which we are the instruments of raising. This is a very difficult question to handle fairly and properly. I agree with the gentleman who has just sat down, that leases have but little to do with it (Hear, hear). At the great meeting at Shrewsbury, when it was remarked that leases should be granted because there was no probability that land could be properly managed without such security, a tenant said, "I should not be such a fool as to take a lease; it is bad enough to hold from year to year." And I am told that land being held in that part from year to year, docks are allowed to grow as high as this table, under the absurd notion that they will exhaust themselves in due time. The question is one of justice between landlords and tenants. If you can devise means by which responsible parties, having the command of capital and of skill, may be received as tenants, the relations of the two will find their level very well; but if you bind landlords to keep a bad tenant, and enable the tenant to triumph when he is in possession, I think the result will be injurious to the cause of agriculture. I should not have troubled you with these observations, but that I feel that the discussion of such a subject must necessarily do good. I wish that, without having a league, something like an effort could be made to do justice to the country; that parties might engage in giving that kind of instruction which will show the necessity for raising more food for an increasing population, instead of circulating the notion of the destruction of the people. We are told that "the greater the number the greater the blessing;" but, in order to establish that, it is necessary to educate landlords as well as tenants, and to show them that the grand object being to make multitudes happy and prosperous, we can only secure it by increased employment both of manual labour and of capital.

Mr. EVE said: There is something very stringent in the wording of the question; and there is no one here, I am sure, who does not rejoice that Mr. Smith did not adopt a wide and random method of introducing it. It appears to me that the gentlemen who have followed Mr. Smith have gone a little wide of the subject. Something has been said about leases. Now, the question is, "the importance of union," and there is something very stringent in the word "union." How necessary was union, even in the formation of this club; and in whatever direction you look, "union is strength." We are not here to sever, but to endeavour to unite; and even where there has been union before between landlord and tenant, it is our duty, as well as our privilege, to endeavour to cement that union and to make it stronger. Mr. Smith has very kindly taken us from Norfolk to the Lothians of Scotland, and, besides giving us proofs of the necessity of union, has shown to what extent union, when properly carried out, will benefit the country. It may appear like harrowing the ground for the third time to speak of the Earl of Leicester's estate, so well referred to by Mr. Smith and Mr. Hobbs. That estate has, however, it seems, been quadrupled in value; and the wealth of the nation has been increased by the increase of production. There is scarcely any limit to the good which may be done in this way. Mr. Smith has taken you to the Lothians, and given you examples of farming, where union is carried out. Again, he has taken you into Lincolnshire, where he has shown you a barren heath converted into a fertile spot. It is very pleasing to hear of these things being done in another country; and instead of feeling jealous at what is related, we should endeavour to follow so good an example. I trust that those landlords who have not followed in the wake of the liberal proprietors who have been referred to, will do so as soon as possible, and encourage their tenants to the utmost extent in the cultivation of the land (Hear, hear). Mr. Smith has stated instances of the increase of farm buildings, the encouragement of draining, and other things which are necessary to the man who keeps a quantity of stock. In all such things union is essential. As I said before, there is something very stringent in that word. Look at the effect of union at our own firesides, and observe what it is to have disunion in our families. How necessary is union between labourers and their employers! how much more necessary between landlords and tenants! There is one point to which I would here invite special attention. We as tenants are a kind of middlemen between the landlord and the labourers; and there will be a union of the three classes when, if the landlord does his duty to us, we do our duty to our labourers. It behoves us to look well to it that

we do our duty to those beneath us. We are told very plainly that the same measure that we mete to others shall be meted out again to us. We have to ask ourselves the question, Do we do by our labourers what we expect our landlords to do by us? and we may rest satisfied that the measure which we have meted to those below us will be meted back again to us by those who are above us, whether it be good or evil. There is one way in which it strikes me a landlord might do a great deal of good to his tenants, which was not mentioned by Mr. Smith. He might purchase a high-prized bull, and introduce into his neighbourhood. We all know the importance of breeding good stock. I don't know anything which would be more likely to excite gratitude on the part of the tenantry than the introduction of a good bull, or stallion; perhaps the introduction of one of Mr. Hobbs's boars or of Mr. Smith's rams would be considered conducive to the same important end. If by these and other means a union were more closely cemented between landlords and farmers, the foreigner would have a very indifferent market here for his produce. I hold—and I have stated the opinion before in this room—that the increase of population is the increase of a nation's wealth. I believe there would be no necessity for sending emigrants abroad if every agriculturist would only put his shoulder to the wheel, and use those means which Providence has placed at his disposal in the production of human food. I would say to every farmer, "Don't think so much of increasing your acres as of increasing your business." That is the acme at which we have to arrive, and not to the increasing of our acres, which cannot take place to a very considerable extent (A voice, "Upon what security?") We are advocating union, and what could be so likely as union to induce landlords to give us security? I myself live under one of the best landlords in the kingdom, and though I am a tenant-at-will, I feel just as secure as if I had a lease. Still that does not prevent me from feeling the necessity for having agreements in the case of those who have bad landlords. Bad landlords are, I believe, the exception, and not the rule. No one here will be bold enough to get up, and say that the majority of landlords are bad. If he did, I for one should very greatly differ with him. I hold that the landlords of this country are a very superior and a very liberal class of men. Unfortunately, within the last three weeks it has been my lot to be called to attend the Court at Chelmsford, in a case in which I was subpœnaed to give evidence as between landlord and tenant; the question raised being whether or not the landlord had done his duty on a neighbouring farm. I went there very unwillingly; but what was the result? Why, the landlord was beaten, and had to pay a considerable sum of money in the form of damages. Two years ago I was summoned to attend a case in the Court of Queen's Bench. In that case the landlord was related to the highest functionary in this kingdom. But that did not alter the justice of the case. The tenant sought his remedy, and obtained it. Now, what I want to see is some preventive for all such cases. I don't want to see the tenant fighting a battle with one who is so great in comparison. In both the cases to which I have referred, I believe the cause of the tenant was just; but it is very unpleasant to be called to give evidence against your own landlord, and I hope I shall never again be placed in a similar situation. I wish to see a bond of union established between landlord and tenant, in reference to the production of the fruits of the earth; and I trust that in any arrangements which may be made, the interests of the labourers will not be neglected.

Mr. Baker: I conceive that the object is to secure for the tenant that protection which all other classes have to a certain extent obtained already. Unless union and confidence exist between landlord and tenant, it is impossible that the utmost quantity of produce can be obtained from the soil. A great alteration in the law is necessary to enable the tenant at will, now placed at the mercy of the landlord, to reap the benefit of his outlay—a benefit which it may occupy many years to extract, and which he cannot extract if he have only the customary six months' notice. The question I conceive to be this—The law being defective, how can it be amended so as to allow compensation for unexhausted capital? I believe this is the point at which we are aiming in this discussion, although it does not come before us under the name of tenant-right. In order to attain union, there must be confidence, and confidence includes something more than is given to the tenant by law. I don't know exactly in what position the tenant-right question now stands; but I do know that there are various opinions upon it, and I know also that there are a great many misrepresentations as to what should be done in reference to it. It has been argued, most ably argued, by the secretary of this club, who has written a most excellent treatise on the subject (cheers), that the fact stated by the Lincolnshire farmers, that they already have tenant-right, constitutes a most powerful reason for conceding it to tenant-farmers generally (Hear, hear). In the county in which I live we have a tenant-right, by which we are able to recover, the last year of the term, for manure, for all tillages on the land, for all cultivation of green crops, and for the rent of the fallow. Still, when the tenant quits his farm, he is not able to recover for any thing under the head of improvements; he receives no compensation for draining, however extensive it may have been, and I have seen some cruel instances of that description. All that the tenant can recover for is manure, tillage, rent of the fallow, in some instances taxes on the fallow, and the expenses of the green crops. Now, the proper remedy for this is, to give the tenant the power of recovering for improvements made in the land by draining or otherwise; for instance, by means of introducing manure—in the last four years at least. That we shall ever get a tenant-right extending over a whole lease of 21 years, or that the tenant should ever recover compensation for improvements made during that lengthened period, appears to me very improbable. Nor, indeed, do I think this necessary. Every tenant must take into account the case of his tenancy continuing or not continuing. If there be not a prospect of his tenancy continuing beyond a certain period, it would be extremely

imprudent for him to invest his money without adequate security. If he invests it at all, it must be at his own risk: at the same time he ought to be enabled to recover for all such things as can be ascertained, and charged to the in-coming tenant in proportion to their fair value. Every one knows, for example, that if he is about to drain a piece of land, he estimates that the drains will last for a certain number of years; if drained with tile, the period will be 20, 30, or 40 years; if in the ordinary way, the drains will last out a lease of 14 years. We frequently drain under special leases; but if in all cases the tenant on entering into possession had an agreement that he should be paid for all improvements of which he had not received the benefit within the last four years of his term, the thing would be easily understood, and there would be no necessity for endless legislation, because the thing would be carried out in practice without resorting to the legislature. I have frequently myself conditioned for payment for all improvements made by draining the land within the last six years, for liming, chalking, marling, &c.; and Mr. Beadell settled an affair of mine, involving a considerable amount, on that principle. There is no practical difficulty in the matter (Hear, hear). The great difficulty is to get some gentlemen to understand it (Hear, hear). There seems to be a determination in some quarters not to understand it (Hear, hear). After I had been examined before a committee of the House of Commons, Sir James Graham came round to me and said, "What do you think of this tenant-right bill?" "Why," I replied, "I think it is a very good bill." "What!" said he, "are you going to make the landlord pay for every bushel of lime that you shoot on the land!" I said, "I am satisfied that the tenant never intends to make any such claim; all he asks is, that when a large quantity of lime has been put on the land, if the beneficial effects cannot be extracted by him before he leaves, he shall be paid in proportion for what is unexhausted, and for nothing more." This shows how the matter is taken up on minute points, and how it is endeavoured to be shown that the object cannot be secured by legislative enactment, though it is constantly effected by special agreement. What we require is a special enactment applicable in all cases in which no special agreement exists. This question has so many ramifications that it would occupy many hours to discuss it fully, and in all its bearings. I must conclude by again expressing my dissent from the opinion that compensation for general improvements can be made to extend over a very long period. I think the sooner we all disabuse our minds of that notion the better. We can only expect to have those improvements paid for which the tenant might have exhausted within a reasonable time, had he continued in the occupation of the farm.

Mr. Hobbs said he feared that many members of the club had mistaken his views with regard to leases. Captain Aitcheson, Mr. Warren, and other gentlemen had rather taken him up on that subject, and had given it as their own opinion that leases were valueless. Now although he did not consider leases the most important object of which they were in search, still he thought it ought not to emanate from that club, nor did he believe that it was the feeling of the club that they would be satisfied with a tenant-right unaccompanied by leases (Hear, hear). He was ready to admit that tenant-right alone would give the farmer more security than he then possessed; but in order to his having that security for the investment of capital which was absolutely required by the practical farmer in the present day, he must possess both a system of leases and of tenant-right. He felt persuaded that he was sufficiently in possession of the minds of the members of that club to be enabled to say that they considered leases necessary for the proper cultivation of the soil. He had been very much delighted to hear Mr. Baker express himself as he had done with regard to tenant-right; for connected as that gentleman was with landed proprietors, his opinion could not fail to have a beneficial influence. He could not agree with him, however, that tenant-right existed in his own county. They had only what Mr. Smith had referred to under the denomination of "tenants'-rights." Though the distinction between the two was clear, they were often confounded by the public at large. "Tenants' rights" included merely ploughing and other acts of husbandry: what they asked from the legislation was a Tenant-right Bill, granting compensation for unexhausted improvements. Ploughing and fallowing could not be regarded as improvements: they did not go beyond the tenant's strict duty during his occupation of the farm, and he only received a sovereign when he had expended one.

Mr. Aitcheson.—You must place the landlords in front of the battle.

Mr. Hobbs said, he hoped that when such cases as he referred to were taken up by such men as Mr. Baker and Mr. Beadell, landlords would soon be brought to regard the whole matter in its true light. Mr. Baker thought that landlords ought not to be called upon to pay for permanent improvements. He (Mr. Hobbs) was of opinion that if a landlord chose, for political or other reasons, to let his land year by year, thus checking agricultural improvement, he ought to be compelled to pay for durable improvements. Some tenants in his own county would be ejected if they were known to have fed their cattle on oil-cake, to have used guano, or to have made other permanent improvements; and he (Mr. Hobbs) could not understand why the tenant's property invested in the soil should not be as much respected as his property in sheep or horses (Hear, hear). In common with the Chairman, he regretted that the attendance that evening was so small. He could only attribute it to the circumstance that most of the farmers connected with that club were men of a superior class, who would not take a farm without security for the investment of their capital either by lease or by tenant-right. Such being their position, they had, he supposed, taken advantage of the fine weather to put in their seed. He hoped, however, that on future occasions such discussions as the present would be more fully attended. It was peculiarly the interest of the farmer to promote discussion: and he hoped that the observations elicited in that

room would always be received both by farmers and landlords in the right manner.

Mr. WALTON did not wish the meeting to run away with the notion that he thought leases valueless under all circumstances. He had merely intended to say that they were valueless in the form in which they were frequently drawn up at present. Tenant-right compensation would be preferable to such leases, but leases and tenant-right combined would be still better (Hear, hear).

Mr. SMITH then replied. He said—I am fully convinced that good will result from the discussion of the subject which I have so feebly brought under your notice. Nothing which I have heard under the different heads of the discussion has weakened my opinion for a single moment as to the importance of union between landlord and tenant (Hear, hear). I have been glad to perceive in the meeting a great desire that the improvement of agriculture should proceed without obstruction. In bringing forward the subject, I did not advocate any particular plan of action, leaving it to others who might follow me to remark on that as the natural consequence of our agreeing as to the importance of union. In conclusion, I beg to thank you for the flattering reception which you have given to me, and to assure you that my only object was that which is I presume kept in view by every member of this club—namely, the advancement of the cause of agriculture (cheers).

The CHAIRMAN said—Gentlemen, before this question is brought to a close, you will perhaps permit me to make one or two observations; though, after the discussion which has taken place, I feel that it would be very improper in me to occupy more than a minute or two. I am not at all surprised at the discursive character which this question has assumed. I apprehend, too, that if our friend Mr. Baker had come into the room a little earlier—although perhaps we might not have benefited more by his remarks, which this evening have been most excellent—yet from one observation which he has made, I think it probable that the discussion would have been still more discursive; for, with that good feeling which I know he entertains towards all parties, and with that high respect with which he regards landlords, and in which to a considerable extent I join him, he has evinced an inclination to proceed more slowly on this question than some of us are disposed to do, and, with that view, in referring to the subject under discussion, substitutes the word "confidence" for "union." Now if there be on the face of the earth one word which I—as an humble individual, not perhaps so capable of judging as others—if there be, I say, in the whole vocabulary of landlord and tenant one word which I detest more than another, it is the word "confidence" (Hear, hear). I would appeal to what has been stated in the discussion this evening as supporting and justifying my view. Our friend Mr. Smith has propounded his own question with a modesty almost, though not quite, as remarkable as that of Mr. Baker; for the one uses the word "union," and the other employs the word "confidence," which is still more soft towards landlords (laughter). Now I would refer to what we have heard from our friend Mr. Smith and others this evening, and ask into what has "union" resolved itself? Mr. Smith told us he considered that there should be something like an established custom—that there should be something like security for the tenant: that there ought to be a contract, under which the landlord should do certain things for the tenant, and amongst other things, he should build cottages for the labourers convenient to the farm. Now I mention these objects simply to show the character of the "union" which our friend Mr. Smith wishes to see established; that the union which he contemplates is not an ideal or ephemeral union, but something substantial, the landlord undertaking to do certain things; and he afterwards told us that the tenant also should perform his contract—in substance, that he should cultivate his land properly. Now I have watched narrowly everything which has fallen this evening, and I have observed that whenever "union" has been referred to, no speaker was able to keep off of the important question of tenant-right. It seemed, after all, to come to this: that tenant-right must be the basis of a sound union between landlord and tenant. All the speakers have admitted that reciprocal advantage must be the basis of anything like a solid union. I think the time is gone by, or at least is rapidly passing away, when it could be supposed that the farmer who invests his £3,000 in the cultivation of his farm is not equally entitled to security for his investment with the landlord who invests his £3,000 in the raw material—the soil itself (cheers). I have watched the tendency of the whole discussion this evening, and the conclusion which I have formed is this—that we must have a reciprocity of a substantial character; that no "union" can be binding, no "union" can be beneficial, no "union" can answer the purpose of either landlord or tenant, lead to the increased employment of the labourer or to the better feeding of the population, but that which is based on a plain, simple contract between man and man, under which each party will understand his rights, and the property of both be protected and secured (cheers). Gentlemen, having made these observations, I will venture to propose, in order that we may arrive at some conclusion this evening, a resolution which I have endeavoured so to mould as to meet the views of my friend Mr. Smith, and which is:—"That the only satisfactory union between landlord and tenant, to develop the resources of British husbandry, is that which is based upon a perfect and complete security for the capital, skill, and industry of the tenant."

Mr. SMITH seconded the resolution.

Mr. AITCHESON proposed the following addition:—"That it is the opinion of this club that, after the discussion of this evening, a form of entry and ejectment should be drawn up, wherein should be stated the exact yearly depreciation of drainage, buildings, and manures, but that these improvements should first be submitted to the landlord, except artificial manures, for his sanction; and if not agreed to, then the tenant should have no claim."

The CHAIRMAN submitted to the proposer that the resolution was rather irrelevant to the actual question before the meeting—namely, the importance of union.

After a few minutes' conversation, Mr. Aitcheson withdrew his proposal, and that proposed by the Chairman was agreed to.

A vote of thanks was given to Mr. Smith as the introducer of the subject, and to the Chairman for his conduct in the chair, and the meeting then terminated.

FLAX CULTIVATION.

A LETTER ADDRESSED TO THE RIGHT HON. THE EARL OF HAREWOOD, AS PRESIDENT OF THE COUNCIL OF THE YORKSHIRE AGRICULTURAL SOCIETY, 1847, SUBSTANTIATING THE OPINIONS EXPRESSED IN A FORMER LETTER TO HIS LORDSHIP AS PRESIDENT OF THE YORKSHIRE AGRICULTURAL SOCIETY; BEING LIKEWISE A REPLY TO THE ATTACKS UPON THAT LETTER, OF MR. JOHN WARNES, OF TRIMMINGHAM, AND MR. J. H. DICKSON, OF LONDON.

By John Wells.

My Lord—I had the honour in August last of addressing a letter to your lordship, as president of the council of the Yorkshire Agricultural Society, upon the subject of flax cultivation, which has given rise to very lengthy remarks from some of the advocates for the cultivation of this crop, through the agricultural press. I now consider it a duty incumbent upon me to offer the following observations in support of the opinion expressed at the conclusion of that address, viz. :—"That line, at present prices, cannot be introduced upon all soils as a staple production, though it may occasionally be grown to advantage as a crop of convenience."

If I may be allowed to judge from the forty columns which two of the parties have engrossed in a recently established Journal, the expression of their opinions must be nearly exhausted. I therefore purpose, as concisely as the circumstances will admit, (without noticing the personality with which I have been assailed,) to substantiate those portions of my former letter which these parties denominate "Prominent Errors."—I shall first draw your lordship's attention to the quality of the land that for generations has been considered the most conducive to the growth of line.

Mr. Warnes states—"That upon *all soils* this crop can be grown to advantage."—*Gardener's and Farmer's Journal*, p. 331 and 378.

A Mr. I. H. Feint* in a letter published in the same Journal, page 44, says—"The cultivation of flax amongst our farmers has never been very popular, notwithstanding the premiums which have been bestowed upon those who raised it—the quantity annually does not appear to be much upon the increase. I have grown many acres with flax during the last seven years, and can say with confidence, that when upon a proper soil, no other crop will pay the farmer better than flax. The soil to which I have found it most appropriate is a *rich alluvial* or *sandy loam*. I manure† and break up the land about Candlemas, after which I give three or four harrowings, &c."

In 1667, Andrew Yarranton, Esq.,* who appears to have had occasion to pass through the county of Warwick on his way to London for many years, remarks upon the adaptation of the land to the growth of flax, and speaking of a particular manor, says—"The land in this manor is *sound, rich, dry, and good, and that is the true land to bear* flax." He then says there are ten thousand acres of such land in the county, and as much in each of three other counties. — *Mark Lane Express*, October 25, 1847.

Jas. Robertson, Esq., D.D., in his work "Agriculture in the County of Perth,"† states—"The culture of flax is universal in this part of the Kingdom, but is not carried to such an extent in any other place as the districts of Stormont, Strathmore, and Athol. The farmers in other places generally grow some for their own use, and where the land is more favourable for that plant, they are able to supply those whose soil does not raise it to advantage. *The clay land seems to be of too close a texture for its tender roots, and binds too much to allow the fibres to expand themselves in quest of nourishment. The light sandy soil, on the other hand, is too weak to carry a heavy crop, and is too much exhausted by it to render the best crop a sufficient recompense for the chance of failure in subsequent crops.* The fittest soil is a *deep loam* or rich haugh on a moist bottom, where the pores are not so close as in the clay or

* Mr. Feint's letter appears to me to be nearly a verbatim copy of the opinion of Mr. Robt. Browne, who published an essay upon farming in the West Riding of Yorkshire, in 1795. —See Warnes upon Flax, p. 475.

† Growers of flax invariably protest against manuring *immediately antecedent to sowing the crop*. The land cannot be in too great condition, but if manured at the time, Mr. T. states, it tends upon most soils to make the crop "grossy"—See Stephens' opinion, p. 13.

* This gentleman published a work upon the subject of flax growing as far back as 1667, thus quaintly entitled "England's improvement by sea and land; to outdo the Dutch without fighting; to pay debts without moneys; to set to work all the poor of England with the growth of our own lands;" a striking proof, that even in those days, zealous advocates for the growth of flax were not wanting.

† I have been much struck in passing through Perthshire, the more especially the Carse of Gowrie, that the cultivation of flax was not more extensively carried on. Nature seems to have granted facilities in every respect in that district, the soil being of the quality so much desired, the season early, and intersected with the river Tay—a valuable acquisition for the steeping; and bordering immediately upon the town of Dundee, one of the largest places in the United Kingdom for the spinning of flax; the only reason the farmer there assigns is, "*that it lies too hard upon the land.*"

till—and the strength of the soil fully equal to the food which the plant requires."

John Smyth, Esq., D.D., upon agriculture in the county of Argyle:—"Few things would contribute more to the advantage of this county than the raising a great quantity of flax, for which our soil and climate are well adapted. Our climate is warm and moist, and we have a great deal of good *sandy loam*, which *is the best ground for* flax. Choice must be made of *suitable ground* for it. A *deep sandy loam in good heart, clean and well pulverized*, is the best. It answers well on *rich ley ground*, as it will be free from weeds, or after potatoes or other cleansing crop." And for fine flax—"The ground should be a *rich light sandy soil.*"

Library of Entertaining Knowledge: — Although flax is easy of growth its quality depends very much on *fitness of soil and situation.*"

Mr. Hazzlitt, Agriculturist to the Flax Improvement Society, at the meeting at Ballinasloe, stated that "*The soil best suited for growing flax was a strong loam on a clay subsoil.*" And again, at the Yorkshire Agricultural Meeting at Scarbro'—"It was scarcely ever grown *upon peaty or light soils without being manured.*"

Mr. Henderson, at the annual meeting of the Earl of Erne's Tenantry in Ireland, remarked:—"I have ever observed the best flax to be grown on *crofting ground, sound, dry, but not gravelly, and deep on a clay subsoil. Loam and holming lands* produce a splendid appearance whilst growing, but the yield is rarely equal to the appearance, and still more rarely do such lands give the fine fibre now so much valued."

Charles Poppy Esq., Witnesham, Suffolk: — "The land Mr. Warnes occupies, with thousands of acres in that district, is capable of being reduced to *a fine tilth early in the spring*, and of being ploughed immediately after the flax is pulled, and *is much less injured by growing flax* than much land of a different texture."—*Farmer's Magazine*, Vol. 16, p. 571.

The *Book of the Farm*, by Stephens:—Flax requires a deep mellow soil, abounding in vegetable matter, *removed both from strong clay and gravel; on the former of which the plant would be coarse, and on the latter the crop scanty.*"—Vol. 2, 2294.

Professor Johnston: — "He believed the best flax crops grow on a loamy soil or a clay subsoil."

Next to the soil I will consider the cultivation, and upon this head Mr. Warnes says:—"It is certain that for none of the causes assigned by Mr. Wells, was the cultivation of flax abandoned, but mainly for want of early sowing; securing the produce before corn harvest, and of saving the seed." And again—"Still more fatal is his system of depositing the seed in the ground to the obtaining of a good and remunerating crop." I have already shown why Mr. Warnes is capable of sowing soon (see extract of Mr. Poppy's letter), and as a natural sequence securing early; but to dictate to others, *what time they can sow, without any knowledge of the district referred to*, is arrogant in the extreme.*

Goole and Marshland, with the adjacent neighbourhood, to the extent of many thousand acres, is entirely subject to seasons for the sowing of crops. It is true that the system of underdraining now so generally adopted will, to some extent, diminish the evil; but when it is considered that the whole of this district lies, upon an average, four feet below high water-mark, is secured by embankments from the Tidal Waters, and artificially drained by means of Cloughs or Sluices, which after heavy rains, have to be kept closed until the waters from the high lands of the west country pass to the Humber—*any unprejudiced mind* will be satisfied that, *appropriate as early sowing may be in some parts, it is not applicable to all.* I could adduce many instances in which it would have been an impossibility to sow our ordinary spring crops in March, which require far less depth of mould and horse-labour than a line crop. If new warp land, of a tenacious character, *is not thoroughly dry at the sole when worked*, the treading of the horses' feet consolidates the frozen mould *and no* mechanical contrivance can pulverize it.* When the land is *in a fit state*, the system I laid down in my former letter insures its regular growth; if it comes up unevenly, it must grow irregularly, and ripen unkindly. A heavy rain, falling prior to sowing, will frequently retard that operation a fortnight. But supposing we were enabled to sow in March,† and the crop progressed as much as could be desired until May, a wet day followed by a frosty night (so prevalent in this quarter during that month) would ruin it.

Upon early sowing I shall no longer comment, neither upon that portion of expenses which comprises manual labour, as it is impossible for this district to compete with the rates paid in several parts of the Sister Kingdom,‡ and I add with regret, in too many places in England. I am well aware, that the cultivation of

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* One of the promoters of the Wiltshire Flax Society, and a strenuous advocate for the general introduction of the flax plant, at the Society's Second Annual Meeting, attributed the non-productiveness of his crop to sowing in March.—See report of Mr. Schomburg's speech, *Devizes Gazette*, January, 1848.

* In this respect I have spared no expense. Crosskill's clod crusher can only be used in dry weather, it renders the land "nutty"—and fastens it at the sole. For potatoes, which do not require so much pulverizing, I have succeeded in damp weather by following the plough immediately with Naylor's patent spike roller. In 1846, I planted one hundred acres by the use of the latter implement, without allowing a harrow to go over the land, but this is of little service in preparing the land for Line.

† Nine-tenths of the practical men, who have favoured the public with their experience of a Line crop, name some portion of the *month of April* as the *fittest time for sowing.*

‡ FLAX.—The Rev. R. Gildea, at Newport, Mayo, has about 600 persons continually at work; the earnings of these people are as follows:—

500 Women spinners average wages, 2s. 2d. per week.	In this district we pay Women and Children 4s. to 4s. 6d. per week.
50 Weavers from 8s. to 12s. per week.	Men at take work 15s. to 18s. per week.
50 Male Labourers, 4s. per week. —*Dublin Evening Mail.*	Daily Labourers 12s. to 15s. per week.

Flax is much to be applauded in some counties in consequence of the labour it creates; but the public mind must not be led away too much by isolated instances of the great benefits accruing from it. It is greatly to be feared that many of those districts, more especially where we find large reductions made in the poor-rates,* by the introduction of the Flax plant, have been previously grossly mismanaged.

My Lord, there is one item, and rather a considerable one, that I must particularly call your Lordship's attention to (for the profit arising from Flax cultivation *mainly depends upon the correctness of the charge)*; I allude to tillage, and I trust I shall be enabled to prove to your Lordship's satisfaction, by extracts from the opinions of scientific and practical men, that this crop, which all its advocates in their calculations have, in every instance when deducing a net profit, never allowed one shilling, is, with very few exceptions *one of the most scourging*† that a farmer can cultivate—if sold to be removed off his occupancy.

Professor Low says:—"Flax is an *exhauster of the soil* and farm, and the more so when its seeds are permitted to arrive at maturity. When pulled green its effects are less injurious, in which respect it follows the general law of other cultivated plants; but still at whatever period reaped, it is thus far an impoverisher of the soil—that its stem yields no return as manure, and that its seeds only do so when consumed upon the farm."

Sir Robert Kane, at the Market-Hill Agricultural Society, said:—"Every farmer was aware that crops exhausted the soil, that the plants take out of the ground a number of materials, and that it was necessary to return a similar material to the ground, in order to keep up its fertility; therefore, the *manure*, which the farmer *puts in with* or *before his seed*, is, in a degree, the raw material of which the growing crop is to be made; it is just as much a part of the plant as the seed itself. When the farmer *sells and sends away his growing crop* to be used for food, as in the case of wheat or oats or potatoes, he thereby *sends away and sells the essence of the manure* which he had put into the ground, and as *he thus gets paid for the manure when it is exhausted, he must put in as much more for the next crop* which must be dealt with in the same way.* The Flax crop can be rendered little or not at all exhausting, by a proper use of its residues as a manure; but it must be recollected that *unless the residue be thus economised, the Flax crop is one of the most severe the land can have; and that the loss of substance to the soil is actually greater than with a corn or potato crop.*"†

Since that meeting, Dr. Kane, in reply to some queries relating to the exhaustion of the soil by the ripening of the seed of the Flax, says:—"As long as the Flax is grown for its fibre, the ligneous tissue being formed from air and water, the exhaustion of the soil may be counteracted, *by restoring to the soil by means of Flax water*, what had been taken away. *But when Flax is grown, for food or for seed, when this seed is separated by rippling, then it becomes like wheat or any other food crop.*"

"The formation of the seed takes from the soil nitrogen and phosphates, which are consumed in use, and cannot be returned to the soil; hence the economy of the residual Flax products as manure, refers to the crop *as grown for fibre*, and does not extend to the growth

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* Mr. Warnes states, that at Trimmingham the poor-rates are *reduced solely* by the introduction of Flax, to 2½d. in the pound per quarter, or 10d. per annum. the Township of Airmyn, in which I reside, contains an area of 3,500 acres, inclusive of wood and waste land, and a population of 630 inhabitants, *solely dependent upon agriculture*, independently of which upwards of *one-third part of the Township*, lying nearest to the towns of Goole and Rawcliffe, *draw their labour from those places*, but by a judicious and proper system, namely, the not allowing an able-bodied man, that belongs to the Township, to be out of work, *our poor-rates never exceed what the Trimmingham rates are reduced to*, and we have not had an acre of Flax worked in the village by the inhabitants for years. Previous to the passing of the New Poor Law, our rates were 1d. to 2d. in the pound lower, and at the present time we have *only one pauper in the Union-house* (an orphan boy). There are other rates more expensive than the poor-rates—highway, county, drainage, and church—which, combined, average about 2s. in the pound.

† Mr. Warnes says "Flax is not an exhausting, but an ameliorating crop."—*Gardeners' and Farmers' Journal*, September, 1847.

* Mr. Warnes says, "in most districts one dressing of farmyard manure suffices for three crops, in others for four, but I never heard of any instance where manure was provided for every crop, *which must be the case were Mr. Wells' theory* substantiated."—Gardeners' and Farmers' Journal, page 331.

† The usual manuring for a potato crop is twenty tons of best dung. I have laid on as much as thirty tons per acre. For a swede turnip crop, which from the nature of the soil we are compelled to pull off and consume in the shades and boxes, twenty tons per acre. For wheat and beans, where potatoes are not grown (see rotation of strong warp), but in no instance do we allow one dressing of manure to suffice for three or four crops.

GENTLE WARP.

Turnips	20	Tons and 4 bushels of dissolved bones.
Potatoes	20	Tons.
Wheat.....	—	
Beans	—	
	4)40	
	10	Tons annually or the amount debited to a Line crop.

STRONG WARP.

Rapeseed & Tares. or Wheat.....	15	Tons. mown green for soiling.
	—	"
Beans	15	"
Oats.....	—	" sown with Clover.
	4)30	
	7½	Tons, being three straw and one green crop.

This is "*Mr. Wells's*" *practice*, except when under seeding, the seeds are sown either upon Line or Wheat—and the bean crop dispensed with—and not more than 10 to 20 acres of summer fallow per annum, out of 700 acres of arable land.

for *food or seed*—this, *like wheat or potatoes, should pay for the good they take out of the land.*"

"The Flax Chaff,* certainly in itself, is very intractable; but not so much so as it looks. When steeped, all that is of any use is dissolved out, and the dry chaff when worked up along with fermenting stable dung, will pass into a good mould. The chaff is, however, of little importance compared with the *Flax water,*† *which certainly holds, dissolved, nine-tenths of all that the plant* derived from the ground."

Dr. Hodges,‡ of the Chemico Agricultural Society of Ulster, at the Council meeting, held on the 31st December last, gave a statement of the results of some investigation recently made in the Laboratory of the Society, for the purpose of ascertaining the amount and value of the ingredients which are dissolved from the Flax plant, in the process of watering. He mentioned "that hitherto we possessed only a single analysis of a Flax water: that given by Sir Robert Kane, in 'The Industrial Resources of Ireland;' but that it was necessary for the guidance of the farmer, who was recommended to apply the contents of his steep-hole to his farm—and which some authorities contended would replace nearly all the inorganic matters that the crop had taken away—that he should be enabled to calculate the value of the matters usually contained in an ordinary flax-hole, so that he might not be induced to expend money in applying to his fields a liquid, which might not be worth the cost. He (Dr. H.) had, by the assistance of a practical farmer, who was well-known as an experienced flax grower, obtained a careful measurement of a pool in which 100 stooks of flax had been steeped for three weeks, and also samples of the water which supplied the pool, and of the flax infusion; and certainly the results of the investigation would not warrant him in recommending the farmer to go to much expense in carting the flax water over his fields. *Where it could be made to flow over his fields, it would be no doubt advisable to make use of it;* but in a majority of cases, in the counties of Down and Antrim, the flax-hole was situated in places from which to apply the liquid as manure to any extent, mechanical contrivances would be required, which are not likely to be met with in this country. It was important to remember, besides, that the value of the material, dissolved in the water of the steep-hole, which he had examined, *was only about four shillings;* that is, that they all could be restored to the farm by means of portable manure for that sum. The analysis had been undertaken at the request of the Royal Flax Society."

In a paper read by Professor Johnston, at the Scarbro' Meeting of the Yorkshire Agricultural Society, I find—"that the growth of flax diminished the quantity of manure, as the seed, stem, root, and everything was pulled up and taken away. *With corn it was different, as the straw which formed a considerable bulk of the produce, was returned to the ground in the shape of manure. Flax was an exhausting crop, common sense and experience have taught this, and it was no use denying it.* Some crops might be better after that crop; *there might be a fine crop of wheat** *after flax: but still, in the long run, the exhausting character of flax would manifest itself.* Now with regard to the rapidity and degree of exhaustion, this depended upon a variety of circumstances:—First, there was the condition of the soil; secondly, the rotation adopted would materially affect the rapidity of the exhaustion; and thirdly, there was the amount of waste in connection with the crop as to the soil. He had prepared a recipe, to return to the soil the mineral ingredients which were taken from it.:—

MANURE FOR FLAX.	lbs.
Bone-dust or bones dissolved in Sulphuric Acid	25
Gypsum	10
Pearl Ash	20
Soda Ash	20
Slaked Magnesia Lime	25
Or for the last may be substituted:—	
Sulphate of Magnesia	20
And Quick Lime mixed with it	5

150 lbs. of this represents 150 lbs. of the ash of the

* I purchase this chaff of the Factors at one penny to five farthings per unheaped bushel, and steam it with wheat chaff. Both horses and young stock are partial to the mixture.

† Mr. Warnes adopts the Courtrai system of rotting: he says "the steeping of Flax is attended with as little difficulty as the other operations, and may be performed in dykes, brooks, and rivers. Mine is packed in crates, ten feet square, upon the edge of a large pond, launched, floated into deep water, and anchored—a boat follows with straw, hurdles, and stones which are placed upon the crate, until it sinks a little beneath the surface—*thus suspended, the current passes slowly through the Flax, carries off the colouring matter* and leaves the fibre clean."—Gardeners' and Farmers' Journal, p. 362. Query, where in this case is the residual manure or steep water?

‡ In a correspondence I had with this gentleman upon Flax cultivation in Ireland, he says, "I have read with much interest your pamphlet. Unfortunately in this country too many loose statements are made on matters connected with agriculture, and until farmers are induced to keep a careful record of their expenditure, as you appear to have done, we must remain ignorant of the true economy of cultivation. I believe that the value of the Flax crop has been greatly exaggerated, and that the extreme cases of profit, &c., published by some parties, are not to be relied upon, in judging of the real advantages of its culture."

* I find wheat to grow better after potatoes than fallows upon old warp soils, if the land for potatoes had been previously well managed—as before stated from 20 to 25 tons dung are laid on the acre for a potato crop—but I never knew any one deny that potatoes were not an exhausting crop. In calculating the profit derived from a potato and wheat crop, when the latter immediately follows the former, it is the invariable practice to credit the potato crop three pounds per acre, and to debit the wheat crop with that amount, it being supposed that the exhaustion of the former is about two thirds of the latter. If lne *at maturity*, when removed off the farm, is what Dr. Kane states, as exhausting as potatoes, it ought to be debited seven pounds per acre for tillage, but taking it as a crop of wheat, then only three pounds per acre—add to which the value of the straw (not for sale) as eatage and manure, it will make up the the price charged in the tables published in my former letter.

plant, or 200 lbs. of the dry plant, say a ton of dry flax. Four to six cwt. of the above must be added to the land to supply the loss, or three cwt. and a good half* manuring.

Mr. Hazzlitt, from the Irish Flax Society, at the same meeting, in reply to a question, stated "that in Ireland they seldom *grew flax on land that required manuring.*"

Mr. Smith, manager of the Model Farm, Santfield, Ireland, at the Council Meeting of the Chemico Agricultural Society of Ulster, in December last, stated "that previous to the farm being converted to its present purpose, it had been cropped as an outfarm, and was therefore in very bad 'heart,' and the more especially as, in the year 1846, nearly the whole of it was under white crops, or what was *far more injurious, Flax,*—inasmuch as the flax crop was carried off the farm."

Sir John Sinclair, in his Code of Agriculture, says, "flax and corn crops cannot be grown on new warp soils, without manure."—p. 318.

Mr. Stephens, in his *Book of the Farm*, p. 1036, says, "sowing flax upon clean land will save much of the weeding (that is after a green crop), as turnips and potatoes, the cleansing of which will have rendered the soil comparatively clean for Flax. If Flax be thus cultivated, in lieu of a corn crop, its culture may be practised without much deterioration to the land; but if it be determined to regard Flax as a green crop, and cause a corn crop to follow it, the land will assuredly feel the scourging effects of such a system, and oblige its cultivators to abandon it altogether. It should never be lost sight of in considering this question, that to raise Flax, must bring it into competition with white crops and not green crops; *because to raise it as a green crop, would be to deteriorate its quality, by bringing it into immediate contact with manure*—and if it be raised without manure, as a fallow crop, it must deteriorate the soil materially—*no species of crop being more scourging to the soil than Flax, not even a crop of turnip seed.*"

James Robertson, Esq., D.D., in his Letter on Perthshire Agriculture, says—"In those parts of the county, where wheat is plentifully propagated, the Flax husbandry is less attended to. *Judgment is discovered in this practice, because both crops scourge the ground, and, in a close rotation, an intelligent farmer can scarcely introduce both.*"

Mr. Stephens in reference to the course of cropping named by Mr. Henderson, the successful competitor for Irish Flax, exhibited in Belfast, 1843, says—"Flax will no doubt grow of finer quality after a wheat crop on land in good condition, or on a soil naturally fertile, as on such soils it would be coarse and apt to branch, if grown after a manuring; and if the main object of the Irish farmer is to grow Flax of the finest quality, it would be better to acquaint him at once *of the deteriorating effect of Flax, thus cultivated, upon the condition of the soil,* than to encourage him to make the other crops he raises subservient to Flax, and to inculcate in him a wrong opinion. There seems another wrong opinion abroad in Ireland, in regard to Flax, that that really valuable plant is neglected in its culture, and that were it not for the neglect of the Irish farmer, he would be much wealthier than he is. He should be distinctly assured that in making money, in cultivating Flax, he must do it *either at the sacrifice of corn or the deterioration of the soil, for both corn and soil he cannot continue to have in perfection, along with fine Flax.*"

Albert D. Thaër, who conducted a large experimental agricultural academical establishment, under the Prussian Government, in the neighbourhood of Berlin, for upwards of twenty years, says in his Principles of Agriculture, p. 537:—"Flax must not be grown again till after a considerable interval on land which has once borne it.* It is thought that a space of at least nine years† ought to intervene between two crops of this plant, even in countries where the soil appears best adapted for its cultivation, and where that cultivation is most successfully carried on, as for example in Belgium."

Mr. Fisher, of Harworth, near Bawtry, an extensive occupier of land, was induced to try Flax cultivation. He sowed part of a clay and sand field (clover-ley), lying on the hill-side, with Line, the remainder of the field with peas: the Line yielded two quarters of seed per acre, the fibre was so short that it would not pay the expense of working and steeping. The whole field was then dressed with three cwts. of Peruvian guano and sown with wheat, which promised well until the end of May, when the Line stubble began to fail, and eventually yielded little more than had been sown; the pea stubble was an average crop.

H. L. Maw, Esq., of Tetley, near Crowle, a considerable landed proprietor and occupier, stated at the Yorkshire Agricultural Meeting at Scarbro', "that the Flax question was one of importance, not merely as regards any particular crop, but as affecting the produce of farms for a series of years. He lived in a district where *Line had been grown longer than perhaps any part of the country*, and his conviction was, that a crop of Seed Line *was as exhausting as a crop of Wheat*, and that growing Line after Wheat, and Wheat after that, would take that from the land which would never be put back again for a great number of years. It was a question of great importance to both landlord and tenant; because, although a tenant might gain more from a particular field‡ by the growth of

* Query. What quantity or weight does the professor consider to be a good half manuring?

* If any grower of Flax sows one half of a field with Line, the remaining half with Beans—after reaping those crops, pursues precisely the same system with the whole field, both as regards tillages and cropping, for seven successive years, and then sows it *entirely* with Line—he will perceive to a perch where the Line grew seven years previously, by its inferiority to the remainder of the field.

† James M'Adam, jun., in his essay on Flax cultivation says, "It may be here observed, that both the Irish and Flemish have been growing Flax at much too small intervals of late on the same soil, and in consequence, the yield has not been so good either in quantity or quality as when the plant was grown less frequently." Journal of the Royal Agricultural Society, p. 369. December, 1847.

‡ It is of the highest importance that landed proprietors should be protected in case of an occupier leaving his farm,

flax, if he was to be a tenant, not merely for one year, but for many years, they must consider the result generally."—*Doncaster Chronicle*, Aug. 16th, 1847.

At the same meeting,* Mr. Bayldon, land-valuer, of Barnsley, stated "that about fifteen years ago he and his friends began to grow flax, but ultimately the general cropping proved worse after it. They tried it on various soils, but without success as profitable culture." —*Ibid.*

In Mr. Rham's Report, "Agriculture in the Netherlands," "The manure for an acre of flax is 12 tons dung, 50 barrels urine, and 5 cwt. rape-cake."—*Journal*, vol. 3, p. 245.

Drs. Kane and Johnston both agree in estimating a good average crop of flax—plant, stem, leaves, roots, and all—at 6,400lbs., containing 320lbs. of ash or mineral materials, per statute acre. The average quantity of phosphoric acid obtained by Dr. Kane from seven different analyses of the flax-plant, as given in his report to the Royal Dublin Society, in April, 1847, was 9 8-10ths lbs. in every 100lbs. of ash; therefore, the quantity of this valuable ingredient taken from the soil by an acre of flax-plants would be on the average 31 3-10ths lbs.

Dr. Hodges gives the quantity from both plant and seed at 33½lbs.

Boussingault states, the potato, in its ordinary condition of moisture, to yield nearly 1 per cent. of ash, which ash contains 11 3-10ths lbs. of phosphoric acid in every 100lbs.; taking the statute acre to yield the *very large produce of* 12 *tons*, we should have 268 6-10ths lbs. of ash, yielding 30 3-10ths lbs. of phosphoric acid in an acre of potatoes. The same authority states, the Swedish turnip in its ordinary condition, to yield 5-10ths per cent. of ash, containing 6 6-10ths per cent. of phosphoric acid; and, taking the acre to produce 25 tons, we have 280lbs. of ash, yielding 17lbs. of phosphoric acid in the statute acre of Swedish turnips. He also states wheat, in its ordinary condition, to yield 2 per cent. of ash, containing 47 per cent. of phosphoric acid; and, taking the produce at 22 cwt., we have 49 2-10ths lbs. of ash, yielding 23 1-10th lbs. of phosphoric acid, in the statute acre of wheat.

Thus we have in the statute acre—

	Mineral Materials.	Phosphoric Acid.
	lbs.	lbs.
Flax	320	31 3-10ths.
Potatoes	268 6-10ths...	30 3-10ths.
Swedish turnips .	280	17
Wheat	49 2-10ths...	23 1-10th.

Showing the correctness of Dr. Kane's observation, in his memoir to the Royal Irish Academy, Dec. 11, 1843, "that he had not met with any analysis of the ash of a plant yielding the same amount of phosphoric acid, and hence *the exceedingly exhausting power of the flax crop* was easily understood."

The stalks of the potatoes, the tops of the turnips, and the straw of the wheat, being all returned to the soil in the ordinary course of farming operations, should be excluded from the comparison.

I shall conclude the subject of exhaustion by reference to an article published in October last, in the *Journal of the Highland Agricultural Society*, by Sir Donald Campbell, which bears ample testimony not only to the quality, but likewise to the condition, of the soil required for the profitable cultivation of flax:—

"The best flax is grown in the neighbourhood of Courtrai, where the soil is a good deep loam, rather light than otherwise. Every preceding crop has reference to the flax, which is considered the most important one in the rotation, and one which, when properly managed, gives most profit to the farmer. The author will therefore shortly notice the process of Flemish cultivation for several crops preparatory to that of flax. On the better kinds of light soils, which are not well adapted for wheat, the usual course is—1st, rye, with turnips in the same year, after the rye is cut; 2nd, oats; 3rd, potatoes or carrots; 4th, rye and turnips; 5th, flax; 6th, clover. When the sand becomes a good light loam, wheat is introduced into the rotation after potatoes or clover; and if the soil is fit for barley, that grain is substituted for rye. On the heavier loams, *colza*, or rape, is an important crop for the seed from which the oil is prepared."

"The land is so cultivated as to improve the texture of the soil, which is abundantly manured. If the land has not been trenched all over with the spade to the depth of 18 or 20 inches, it has been equally well stirred by the narrow open drains, which are dug out 12 or 15 inches deep every year between the stitches in which it is laid by the plough. These drains or water-furrows are a foot wide, and from a foot to 18 inches deep. The earth taken out of them is spread evenly over the land after the corn is sown. When the ground is ploughed again, care is taken that the place of these water-furrows *shall be shifted a foot on each side.* Thus in six years the whole soil is deepened, and thoroughly mixed with whatever manure has been put on. This produces the same effect as trenching, and even more perfectly. The whole of the land on which the best flax grows has been treated in this manner for several generations, and in fact may be looked upon *as a species of compost* 18 *inches deep.* Potatoes or colza are usually planted with a double portion of manure, after which wheat is sown slightly manured, then rye, with turnips sown the same year after the rye. These are taken up about October, and stored for winter use. The land has been well weeded while the turnips were growing, and all the manure is decomposed and mixed with the soil. It is ploughed in stitches before winter, some manure having been previously spread over it if necessary, and it is left, exposed to the mellowing influence of frost and snow. As soon as the winter is over, the final preparation goes on. Deep ploughing and harrowing further pulverise the soil, and the surface is laid as smooth and level as a bowling-green, if there is no fear of too much wet (which in the light loam soon disappears), or else it is divided into beds, with water-furrows between them.

"Now comes the manuring, about which the Flemish farmer is particularly careful. On every farm there is a large vaulted cistern, in which the urine of the cattle and horses, the drainings from dunghills, &c., are collected, and where they are occasionably stirred to excite fermentation. Every kind of vegetable or animal matter is carefully collected, and made to

both as to the quantity grown and the amount of manure to be purchased as recompense for deterioration, *if the residual manures are not returned to the farm.*

* This gentleman, in writing subsequently upon the subject, says, "I was glad to see your pamphlet on flax cultivation, and I agree with you that line cannot be grown on all oils as a staple production."

undergo the putrefactive fermentation, by being mixed with others, partially decomposed. Nothing excites heat or putrefaction more than urine, when it is poured over substance subject to decomposition; and therefore in every farm-yard there is a pit into which the objects acted upon are thrown, and into which a portion of the urine and drainings is made to flow. By frequently moving and stirring the mass, decomposition goes on rapidly, heat is evolved, and the fibres and dried juices of vegetables are decomposed, and become soluble in water, in which state their effect on vegetation is greatest. When the supply from the pit and the vaulted cistern is not sufficient, recourse is had to the refuse cakes of colza, from which the oil has been pressed out. These are dissolved with cow-dung in urine or water, and put into the cistern to decompose. When it is in a proper state it is used on the land in which flax is sown, as it is a very rich manure, and perfectly free from the seeds of noxious weeds. This mixture is carried to the field in barrel-carts, and applied to the land at the rate of about 2,500 gallons of the mixture to the acre. Peat ashes are also used when they can be procured, and are considered excellent; lime is not approved of.

"The manure being poured on, the harrows are drawn over the field, and it is left so for a few days, that the manure may suck in. This should be accomplished by the middle or end of April. The land is then again harrowed lightly, and the flax-seed is sown broadcast by hand, very thick and even, about a hundred-weight and a half to the acre. A bush harrow, or hurdle, is drawn over, merely to cover the seed, which would not vegetate if it were buried half an inch deep. According to the state of the land, it is rolled or not, or the seed is trodden in by men, as is done with fine seeds in gardens; this, however, is on the lightest soils. Most commonly the *traineau* is drawn over the land. This is a wooden frame with boards nailed closely over it, which is drawn flat over the ground, to level and gently press it. In a short time the plants of flax come up thick and evenly, and with them also some weeds. As soon as the flax is a few inches high, the weeds are carefully taken out by women and children, who do this work on their hands and knees, both to see the weeds better, and not to hurt the flax with their feet. They tie coarse pieces of cloth round their knees, and creep on with their faces to the wind if possible. This is done that the tender flax, which has been bent down by creeping over it, may be assisted by the wind in rising. The weeding is repeated till the flax is too high to admit of it."

The next important point in reference to flax culture is, whether the transition from line to flax ought to be performed by the farmer or factor.* Upon *no other crop* does the cultivator of the soil extend his management beyond production, and if a contrary principle is once admitted, we must calculate the profits upon a wheat crop when made into meal, oats when shelled, and barley when malted—all more easy of accomplishment, as regards labour and attention, than the steeping and scutching of line for fine flax; because the operations of the former may be undertaken during the winter season, whilst the watering of the latter can only be *properly* performed during warm weather, and as I have shown in my previous letter, the securing of the crop frequently requires considerable labour in corn harvest. If the producer is determined to make the most of his flax crop, he must pay it so much attention, that it will militate against his general farming pursuits; for there are few localities during that busy season of the year in which he could command a sufficient staff to carry out both systems. The growers are well aware that the factor sometimes obtains a considerable profit, otherwise like all *middle-men* his calling would cease to exist; but, with this knowledge fully developed, factorship has of late years increased, and at the present time the principal portion of line produced in this country and the Isle of Axholme* is in the hands of factors; in fact, so popular has the system become with the producer, that nine-tenths would abandon the cultivation of line, if *compelled to water and scutch it themselves.*† Professor Johnston says, "Very great attention is required in the management of flax. Flax of good quality should be pulled before it is ripe; the time of steeping and grassing must be carefully attended to, as, if left a day too long, under these operations, the quality of the fibre would be affected. *It should be cultivated by persons who can look after it themselves, for, if left to a second person, there might be a considerable loss of profit.*"

The following appears in the report of the Flax Improvement Society of Ireland, 1844:—"The gentlemen who engaged in this new branch of business (factorship) last year, from having too much in hand, were unable to realize any profit, as much of the flax was greatly injured by their inability to have the different processes, in so large a quantity of flax, managed by their infantine establishments. This season those who have purchased flax on the foot have expressed themselves well satisfied with the result of their enterprise, that *the system of factorship will ultimately prevail in the North of Ireland your committee have every reason to think.*"

In the first report of the Ipswich Branch of the Flax Society, under this head:—"Your committee are of opinion that the establishment of district depôts for the reception and preparation of the grower's stalks, under the control of the societies, *would tend greatly to the permanent introduction of the crop;* but when it is remembered that they must at first be mainly conducted by foreign instructors, the prospect of affording satisfaction to all parties would be doubtful; they are therefore disposed to think that *the formation of a Joint Stock Company, with branches attached to purchase the crops, would be the more effectual expedient.*"

* Mr. Warnes says "the disposal of the crop to factors, called Lumners, who carried the whole off the land, root and branch, was a system that no landlord could be expected to tolerate, and one that afforded the tenant only a nominal profit."—Gardeners' and Farmers' Journal, p. 314.

* Considered the most suitable soil in England for the cultivation of the flax plant.

† Line has been cultivated upon the Booth Ferry Farm upwards of sixty years, but was discontinued about fifteen years ago, until 1845, when it was recommenced for the reason stated in my previous letter. Formerly it was steeped and swingled upon the premises, and the prices realized for the first twenty years varied from 6s. to 10s. per stone; the rent of the land and the value of labour were about one-half of what are at present paid—it afterwards increased in price from 10s. to 15s. per stone, and the expense in proportion. For the value since 1840, see my former letter, p. 8.

In Mr. Nichol's essay, p. 451, Royal Agricultural Society, referring to the Belgians :—"It is not unusual for the farmers to sell their standing crop of flax to a factor, who takes upon himself all the subsequent risk and expense. The factor pulls and removes the flax to some favourite locality for steeping, where the several operations are performed on a large scale by expert workmen, which enables him to obtain a *more valuable description of fibre than the farmers would probably be able to produce.* It is likewise a frequent practice in Belgium for the farmer to pull, dry, and stack his flax, and afterwards sell it to the factor, who removes it to a steeping place, &c.* *The practice of factoring, as above described, might no doubt be introduced with advantage in this country, especially in the vicinity of good steeping places.*"

The absolute necessity of flax factorship is corroborated by Mr. Brown, and the other practical farmers who spoke at the Wiltshire Flax Society's Annual Meeting held at Devizes last week.—See Devizes Gazette, January, 1848.

Another and very important reason why flax factorship will continue to prevail is, that if worked through to the best advantage by the farmer, he will receive no return for nearly two years.† In the production of his other crops he only turns a portion of his capital over once in twelve months, the remaining portion being *a dead rest ;* it cannot, therefore, be expected that unless very considerable pecuniary advantage was derived, a crop requiring so much attention and such a lengthened outlay should become popular.

The grand panacea of the visionaries‡ on flax cultivation seems to be what is termed the improved management of the fibre after pulling ; and where nature has granted them the advantages possessed by the Belgians, no doubt an equal quality may be produced ; but in this country there are no pure running streams, no river Lys wherein to steep the fibre, no hills at the summit of which ponds might be made to allow the steep-water to irrigate and improve the fertility of sloping meadows ; the eye rests on nothing but a dead level, intersected with the tidal rivers—Ouse, Don, Trent, and their tributaries—all so impregnated with mud, that one crate, packed and launched upon the Courtrai system, would in three days become a solid body of warp. Despite these drawbacks, men of capital and genius have endeavoured to overcome the natural obstacles by art and perseverance.

About the year 1820, the Messrs. Walkers erected very extensive and commodious premises betwixt the towns of Goole and Snaith on the banks of the river Aire, and in the immediate vicinity of the populous village of Rawcliffe. To supply these works, the principal portion of line (at that time a staple production) grown in the neighbourhood was purchased, and there underwent the process of rotting. Seed line after thrashing was steeped in the ordinary way in ponds adjoining, broken and scutched, or swingled by machinery propelled by steam-power ; the oil expressed from the seed, and the refuse made into cake, by the same powerful agent. White line, in lieu of ponding, was laid upon floors heated by steam-pipes, &c., and when sufficiently tendered treated similarly to the seed line. When scutched it was immersed in warm water tanks, and after undergoing a chemical process hackled, and I understand was considered a perfect specimen of fine quality. In 1826, the proprietors having tried every experiment that ingenuity could devise, regardless of expense, abandoned a speculation, which they found, if persevered in, could only tend to ruin.* Two other attempts have been made to carry on the works, but without success ; the premises are now unoccupied. The Messrs. Marshall, of Leeds, have near Antwerp a large establishment for the production of flax—such, says the Ipswich Flax Society's Report, *as if formed in every county of England would at once ensure to the grower a ready market for their crops.* These gentlemen have likewise commenced flax growing in Holderness, and are endeavouring to overcome the obstacles which exist in that part of the East Riding of Yorkshire, by steeping the fibre in warm water tanks.†

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* In this neighbourhood, when the factor and the farmer cannot agree for price, and the latter is not necessitated for money, a similar system is adopted.

† Flax grown one year ought not to be steeped until the June following ; it is essential for the quality of the flax that this operation should be performed during the warm season of the year, unless Schenk's patent process comes into general operation. Mr. Warnes says, "At leisure the crop is thrashed, and at intervals steeped, bleached, and dressed—*weeks, months, and even years pass between each process,* so that employment is rendered subservient to the requirements of the poor."—Farmers' and Gardeners' Journal, p. 362.

‡ "I can show Mr. Wells the names and residences of my correspondents who have grown flax this last year by my instructions, some five and some ten acres each as a trial, and that I have the offer of nearly three hundred acres to be either sent over to scutch or sold at whatever I think the stalks worth ; the *latter offer I have invariably refused, and have advised all my friends to hold over their flax to next year, when I calculate many mills will be erected in different counties.*" J. H. Dixon.—Gardeners' and Farmers' Journal, p. 346.

* The late Mr. Huntress, who had the management of this undertaking at the close of the works, stated that upwards of forty thousand pounds had been expended—the whole of which, with the exception of the buildings (since sold for £1,200), was lost.

† Mr. Warnes calls this "a new light."—Doncaster Gazette, January, 1848. I should be inclined to consider it "Schenk's patent method of watering flax," which is accomplished by placing the flax in vats constructed for the purpose, which may be of any convenient size, but should be proportioned to about fifty feet in length to six feet wide, and never exceed four feet in height. They may be built of wood or brick cemented. Along the bottom of the vat are placed cast-iron pipes—commencing at one end, and returning by a bend at the other, forming two parallel lines ; these pipes are connected at one end with a steam boiler, and are laid with a gradual slope to allow the water of condensation to run off at the other or open end. Above these pipes is a wooden platform, perforated with small holes to allow a free circulation of water upon the platform. The flax is placed in nearly a perpendicular position, with the roots down ; above the flax is a frame work of loose pieces, which are placed across the vats, with the ends

These, my Lord, are sufficient proofs that in many districts, supposing the farmers were desirous to cultivate this crop, and their soil to be suitable, expensive buildings and works would have to be erected to carry out a profitable result—an outlay that the proprietors of land would scarcely venture upon, and which the occupiers could not be expected to make.

In trespassing originally upon your Lordship's attention respecting this crop, it was with no wish to retard flax cultivation; but having latterly seen continual reports puffed through the press, of the immense advantages to be derived from its general growth, advantages which on an average of years I knew to be ideal, I considered it a duty I owed to the owners and occupiers of landed property that some stand should be made against it; for of all crops that the farmer grows, *this is one of the most precarious*, * and, as such, in citing the profits to be derived, *not one* but *an average* of *years* ought to be taken. For example, the average yield in this country, in 1846, was under 20 stones; in 1847, about 40 stones per statute acre.

If heavy rains succeed the sowing of line, followed by dry winds, the crop is frequently ploughed up. In some parts of Holland † it is the practice of parties to take land to sow with this crop, to pay so much per acre, reserving a right of giving up the bargain at Midsummer, if the appearance of the crop should not then be so good as anticipated, thus sacrificing their seed and labour. The lodging ‡ of the crops by heavy rain is another drawback, as it spoils the colour and tenders the fibre.

Mr. James Sinclair, of Holy Hill, says: "I live amongst growers of flax, and have *this year seen considerable loss from cultivating it*. Every other crop has paid the farmer; *flax alone has failed to do so*, and not only has it failed to pay the farmer, but to the labourer it holds out diminished prospects of employment, exertions having been made to introduce what is called *improved machinery*—although it had been understood that the simple scutching mills in use are quite as good as the most costly, and that hand-scutched flax is the best of all." * —*Farmers' Gazette*, Dec. 23, 1847,

The following statement of the profit to be derived from flax cultivation appeared in the Belfast Improvement Society's report, 31st October, 1845;

In Dixon on Flax, page 169;

In an official document for 1846;

In Warnes upon Flax, page 276;

In the Gardeners' and Farmers' Journal, page 218;

In the Evening Express, Oct. 25th, 1847;

In a letter circulated by Mr. Dixon, dated October last;

Quoted by Mr. Marshall, at the Flax Society's Meeting, at Bandon, in Ireland, 1847; and copied into various other Provincial Journals:—

"Model Farm of Calendon, Nov. 29th, 1845.

"SIR,—In answer to yours of the 24th, I have much pleasure in furnishing you with an account of the flax crop, and expenses thereon, grown on the Earl of Calendon's Model Farm in 1845:—

CROP.	£.	s.	d.
Produce of 1 acre, 1 rood, 39 perches, sold at 11s. 9d. per stone.	55	19	7½
Tow	0	8	0
130 bushels of Bolls, which I consider well worth 8d. per bushel	4	6	8
	£60	14	3½

EXPENSES OF CROP.			
5 bushels of Seed	3	16	6
Weeding	0	10	0
Pulling, Rippling, and Steeping	4	3	8
Taking out of Steep—Spreading	2	1	4
Lifting and Tying	1	2	8
Scutching †	4	9	4½
	16	3	6½
Leaving a balance of	£44	10	9

Or at the rate of £29 13s. 10d. *per acre, after deducting all expenses.*

"It is but fair to add, that we had to carry the flax to and from the steep on barrows for eight perches, as the steep was in a bog, and the carts could not get near it; consequently, had the carts got close to the steep, there would have been at least £1 10s. saved.

"I am, Sir,

"Your most obedient servant,

"JOHN BARR, Manager.

"J. Macadam, Junior, Esq."

Your Lordship will perceive that *no deduction is made for rent, rates, taxes, ploughing, sowing, harrowing, and delivery to purchaser*; and the price put down for labour would, in this country, entail disgrace upon the employer, and what only a starving community would submit to—being about *one-third* of its value here; and as it is evident, from the steep being in a bog, that the

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confined under a bracket near the top of the vat, for the purpose of keeping the flax from rising. The water is then admitted, when the vat is filled and the plants entirely covered, the steam is turned on, and the water heated to the temperature of 90 degrees Fahrenheit. The heated water begins immediately to dissolve the glutinous matter, and within a few hours acetous fermentation commences. This spedily decomposes the gluten, abstracts the colour, and leaves the fibre in a state to be readily separated from the stem. After remaining in the vat about sixty hours, the vat is emptied by a sluice-gate, and the plants taken out to be dried.

* Edmund Thompson, Esq., of West Mount, Scarbro', formerly a considerable occupier of land, and a flax grower in this neighbourhood, in a letter addressed to me upon the subject says, "I think your pamphlet embraces the whole question, with the exception of the *precariousness of the crop*, which is not sufficiently stated."

† This is upon the alluvial soil which so nearly resembles the neighbourhood in which I reside.

‡ In this respect we are very unfortunate, not only with line but corn crops—the land being in so high a state of cultivation for the growth of potatoes—the first heavy rain after Midsummer effects the mischief.

* Upon this point considerable difference exists; Mr. Dixon, the great advocate for mill-scutched flax, not having accepted Mr. Warnes' Belgian hand-flax-dresser's challenge, which appeared in the *Mark Lane Express*, in December last, seems rather to confirm Mr. Sinclair's opinion.

† 95 stones, or 11d. per stone; in Yorkshire it would cost 2s. 6d. per stone

steep water could not be returned to the soil, and full credit is taken for the value of the bolls, *a very handsome allowance ought to have been made for the exhaustion.* Perhaps in no country has so great an exertion been made as in Ireland to introduce flax cultivation; and when we consider the pauperised state of its inhabitants, and the fertility of its soil, no crop more likely to answer better—labour being the chief part of the outlay. In addition to these natural advantages, and the existence of the Irish Flax Society, with powerful means at command (£1,400 per annum), which by printing, circulating, agency, &c., was enabled to draw the attention of the country to the crop to such an extent, that the crop of flax in Ireland increased from 25,000 tons in 1841, to 39,000 tons in 1844; but that in consequence of disappointment generally sustained in its culture by practical farmers (disappointment which upon so *precarious* a crop must continue, and which is one great cause of its not being popular) it fell back to 25,000 tons in each of the years 1845 and 1846, and did not reach 20,000 tons in 1847, though we are told the breadth of land sown was nearly 5,000 acres more.*

The following extract from Mr. Tuke's pamphlet, "A Visit to Connaught, in 1847," sufficiently corroborates the opinion of writers previously quoted, the soil and climate of that district being peculiarly suited to the growth of flax:—"Sir R. O'Donnell's name has been so frequently mentioned in connection with the growth of flax in Mayo, that it may be as well to state a few particulars relative to the proceedings on his estate. At the time of my visit to the neighbourhood of Newport, nearly one thousand persons, principally women, were engaged by Sir R. O'Donnell, in harvesting the crops; the women earned fourpence per day, the men eightpence; even at this miserable rate of wages, I have seldom seen more cheerful or industrious labourers. In some places this work was just ending, and I was much struck with the earnest appeals which the poor creatures made to us, to obtain work for them during the coming season, supposing from the enquiries made that we had some power of assisting them. Nearly half of the flax grown around Newport is in Sir R. O'Donnell's own hands, and he is purchasing the remainder from his tenants *at the rate of £5 to £7, and in some instances £9 per acre.* I fear these prices will prove but little remunerative to the farmers and cottier tenants. The rent of the land on which the flax is grown, though in some places appearing little better than a bog, is often from 30s. to 35s. per acre; the seed costs about 25s.; and two diggings which are required may be reckoned at 28s., to which must be added the county cess and taxes, as well as *the cost of the extra quantity of manure after so exhausting a crop as flax.* After these outlays, there can be but little left for the tenant to live upon; at the same time, all my other enquiries left no doubt on my mind, that the value of a crop of flax did mostly leave a very handsome remuneration, after the payment of charges attendant on its cultivation. Several growers in the neighbourhood stated to me that their crops were worth £15 to £20 per acre.* The only explanation which I could obtain of the great difference between these prices, and those obtained by Sir R. O. Donnell's tenants, was *that the latter were liable to distraint for arrears of rent, and thus they were entirely in the hands of the landlord;* but I am willing to hope that there did exist a difference in the value of these crops. I was informed that the average produce of flax per acre, after scutching, is eight hundred weight. Sir R. O. Donnell, amongst other improvements, is building a flour and scutching mill at Newport."

The Rev. Mr. Gildea has been encouraging the growth of flax in Mayo to a considerable extent. His exertions were a subject of deserved praise at the late meeting of the Irish council; and, *inter alia*, in connection with his success, a very exorbitant price was ascribed to well-prepared flax. It is as well to disabuse the public of any extreme impressions on a subject of such importance; and Mr. Bankhead, of the council of the Agricultural Society, and *at one time a very extensive* flax grower, thus writes on the subject:—"Now, I look upon it to be important that the actual profit should be clearly understood; and though Mr. Gildea may be quite correct in stating that an (Irish) acre would produce dressed flax worth £40, for I know that more has been realized, yet I am well aware that *the average would be rather under than over £20.*† In Down we look upon sixty stone to the acre as *a good crop*, and taking 6s. 8d. as the average would make the sum I mention." A strange contrast with the £29 10s. 10d. *net profit* per English acre on the Calendon farm!

Having now sufficiently refuted what my opponents are pleased to call "prominent errors," I shall conclude by exposing one of the greatest fallacies they themselves labour under—I allude to the material advantage which they argue must accrue if the requirements of the spinners were met by the producers *of this country.* Mr. Warnes tells us we pay annually to foreigners seven millions for flax, seed, and cake, which by home production might be saved. Mr. Nichols from statistics says five millions and a half. How either of these gentlemen can for a moment suppose, if the whole were grown in the United Kingdom, we should be gainers that amount, I am at a loss to conceive. Flax, I have shown, must be *sown on good soil, and in high condition; that its profitable cultivation depends in many districts, where the soil is suitable, to the price of labour and convenience for watering; that upon all soils, unless its resi-*

* See Mr. Beamish's letter in the Cork Constitutional.

* Irish Acre.

† "With respect to Mr. Wells' quotation from Mr. Bankhead, I shall be in possession of the facts and Mr. B.' ideas next week." J. H. Dickson.—Gardeners' and Farmers' Journal, p. 446. "I have by this post sent a copy to Mr. Bankhead of Mr. Wells' quotation, to know if it was possible that he could so far forget the price of flax in the county of Down as to average it at 6s. 8d. per stone. * * * I shall be prepared, after hearing from that gentleman, to enlighten your readers more on the subject."—Gardeners' and Farmers' Journal, p. 378. J. H. Dickson. I *know* Mr. Bankhead did answer Mr. Dickson's letter, I am therefore sorry he has not enlightened the readers of that publication.

dues are returned to the farm, it is one of the most exhausting crops that a farmer can cultivate; that it is a *precarious one most practical men admit, and that the transition from line to flax, by the grower, is a very questionable point;* the only advantage the farmer gains is the consumption of a portion of the produce (seed), and that can generally be purchased at a less rate than grown.* To produce a ton of flax of average quality, four acres of land are required; and the value when ready for market may be taken at fifty pounds; † this sum, in lieu of being saved to the country, is simply a substitute for:

	£. s. d.
1 acre or 72 tubs of Potatoes, 8½ Tons at 45s. ‡ per ton	19 2 6
1 acre or 4 quarters of Wheat, at 60s. per qr. ..	12 0 0
1 acre or 5 quarters of Beans, at 40s. per qr. ..	10 0 0
1 acre or 7 quarters of Oats, at 23s. per qr... ..	8 1 0
	£49 3 6
4 acres of flax	£50 0 0

I have calculated the whole as a full crop, though on an average of years the beans and flax crops are the most precarious. Then we have the straw from the three corn crops, the stubble which is left on the land (and which upon strong soils is of great importance in keeping open the furrows and allowing the action of the frost to ameliorate it), the employment of British shipping, and the value of the sowing seed, to balance against the value of the seed produced, *without taking into consideration that we are substituting cattle for human food.* If, on the other hand, the occupiers of the soil are to be compelled to consume all the seed upon the farm, from whence are we to derive the oil? At the present time we not only crush for the wants of our own country, but export § largely to America and the Continental ports. If the demand for cake ‖ subsides, the price of oil must materially rise; it is notorious that the crushing trade, notwithstanding the high price of cake, has of late years been anything but lucrative; if it is not intended to abandon this branch of our commerce and manufacture, the seed must still be imported, and if the foreigners find a market for their seed, they will not require one for their fibre? But admitting, for the sake of argument, that we change our course of cultivation, and supply the spinners with the 70,000 tons of flax which we now import, will not the value be materially diminished when this extra production comes in contact with the foreign growth? Where then will be the boasted profits of flax cultivation? This solves the enigma why the advocates for the growth of flax in this country are supported, *not only with the opinions, but also by the contributions of the flax spinners of the United Kingdom.** The more flax is produced, the lower in price will they arrive at the raw material, thus enabling them better to compete with their Continental neighbours.†

My Lord, I have trespassed upon your patience at great length, but I am actuated solely by a desire that the *merits of flax cultivation may be perfectly understood.* I am neither bigoted in favour of, nor prejudiced against, a crop which has not only been grown,‡ but likewise manufactured into fine linen,§ from the earliest ages. We must also bear in mind *that the area of our country continues the same, whilst our population is rapidly increasing;* it is, therefore, a question of no slight importance, whether *it is policy to substitute cattle for human food.* To obtain the latter, in my opinion, ought to be the principal consideration; and I can testify, from the farms I have visited in England and Scotland, that even the best cultivated are capable of employing manual labour to a greater extent than at present. It is a wise ordination of Providence, that where manual labour is judiciously employed an adequate compensation is generally received; let then every occupier of the soil, instead of investing his spare capital for years in flax stalks—the manufacture of which seems likely, at no distant period, to be performed principally by machinery—employ it in increasing the production of *necessary crops,* either by draining, stubbing, levelling, &c., and he will find that to be the true way of benefiting his country, ¶ and saving the exportation of the precious metals.

In conclusion, I trust your Lordship will overlook any provincialisms ** that I may have used in this address; I have laboured to write *common sense,* and to make myself understood. It is not by rhetorical flourishes, verbose criticism, or Shakesperian quotations,†† that a subject of this importance ought to be discussed; and if my humble efforts have shed any light upon this question, I shall consider myself amply repaid for the trouble and expense I have incurred.

I have the honour to be, my Lord,
Your Lordship's obedient and humble servant,
JOHN WELLS.

Booth Ferry and Airmyn Pastures,
Goole, Jan. 28th, 1848.

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* The southern provinces of Russia seed, which contains more oil than the average of English, can now be purchased at 45s. per qr. English seed commands from 55s. to 58s.

† On reference to the prices current on the 31st December last, of English, Irish, and Foreign flax, I find it will not average that value.

‡ Present value £8 per ton.

§ The importation of linseed into the neighbouring port of Hull alone, for the last year, was upwards of two hundred thousand quarters; the quantity of oil produced upwards of nine thousand tons, of which, 3,140 tuns were exported to the United States and Continental ports.

‖ At Hull and Gainsbro' about thirty-five thousand tons of cake were manufactured in 1847

* See page 244, Dickson on Flax. List of contributions.

‡ I would willingly facilitate any movement in favour of the manufacturing interest, but not at the expense of other communities, unless it could be *satisfactorily* proved to be a national benefit.

‡ 9 chap. Exodus, 31 v.

§ 14 chap. Genesis, 42 v.; 19 chap. Revelations, v 8.

¶ Dr. Johnson said, that he who made two blades of grass, grow where but one grew before, had conferred a benefit upon his country.

** So prejudiced is Mr. Warnes against my former letter that he condemns in unmeasured terms the system of "suckling" adopted in this district. Had he paid attention to the note at the foot of page 1, he would have discovered it was synonymous with "capping."

†† See Warnes and Dickson's Letters. — Gardeners' and Farmers' Journal, Oct., Nov., and Dec., 1847.

OBSERVATIONS ON THE CAUSES OF DECLINE IN OUR STOCK OF GOOD HORSES; ON BREEDING; AND ON QUEEN'S PLATES AND RACING.

BY W. J. GODWIN, M.R.C.V.S., BIRMINGHAM.

Sir,—Your last number contained some remarks by Mr. Goodwin, Veterinary Surgeon to the Queen, on Breeding of Horses, and on Queen's Plates as connected therewith (apparently called forth by a pamphlet on the same subject by Mr. Cherry, principal Veterinary Surgeon to the army), in which that gentleman appears to look upon the make and shape of a horse as no criterion whereby we may judge of his qualifications for racing or other purposes, and to consider it inconsistent for breeders to turn their attention to strength, shape, temper, action, &c.; adding, that "neither can Mr. Cherry nor any other man in the world give an estimate of the character of a horse by looking at him." Now, if he means, pick out a winner of the Derby by such mode, I agree with him, otherwise I must dissent from him in opinion; notwithstanding, I am ready to admit that nature, in her vagaries, will often lead us wide of the mark. And since this is a subject entertainable by veterinary surgeons, I cannot refrain offering my views thereon; and especially am induced so to do, seeing they differ materially upon some points from an authority which, I fear, might be considered as laying down a principle, an established fact, should such be allowed to pass without comment.

I shall attempt to shew that the different breeds of horses in this kingdom, employed as hunters, carriage, or cavalry horses, or as hacks, are fast degenerating; and that the system adopted in the present day, of breeding for the turf to contend in short distances, and with light weights, has a tendency to produce this effect, by reducing the necessity of the race-horse being the large, powerful animal, that, I contend, is advantageous to this or any other country, to improve the breed of horses for general purposes. I am of opinion, with Mr. Cherry, that some means should be adopted by government to enable farmers and other breeders of horses to obtain the use of stallions of a good class, free from defects likely to be entailed on their progeny; and that if some plan for this purpose is not employed, the breed in this country will be on the decline, if it be not at present. Look at the names of first-rate stallions in days gone by, and find, if you can, any common horse in appearance whose descendants have been successful to the second generation, or whose blood has been sought by breeders; and then observe the animals that form the entries for our great handicaps of late years. Take about 20 out of the 130 entries for the Chester cup, and behold what a stud, except as race-horses, from which a share of the future stock of this country is to be produced. Still, most of them are good enough to win, in their turn, some moderate stake during their career, either by getting favourably handicapped, meeting a field of the same class, or some other fortuitous circumstance resulting from the present system of racing. As regards the scarcity of hunters, I feel confident that "Pegasus" is in error, when he observes, in *Bell's Life* of the 6th inst., in refutation of Sir Harry Smith's assertion, "that it would be difficult to obtain 500 hunters, if required, for the use of the cavalry," that 5000 could be easily bought, if wanted. Pegasus has evidently not been in the market for the last few years, or he would know better; and, moreover, would be satisfied that the higher class of horses are every year more difficult to be found. Ask Elmore, Smart, Kench, Anderson, Collins, or any other dealer in the best description of horse, the difference in expense incurred between now and some few years back to find them; and I feel little doubt but they would confirm my statement, that they at the present day spend more money in travelling, and paying others on the look-out for them, than some years back would have half purchased them. I am of opinion that none of them would undertake a contract to supply 500 well-bred, clean, sound horses, under eight years old, perfect as hunters, and equal to fourteen stone, with one month's notice at the commencement of the season, at 150 guineas each. They are not to be found without great exertion, and a perfect knowledge of the where-abouts of almost every hunter of character in the kingdom; and, after that, the judgment is required to select the class of hunter for the different countries they are afterwards to perform in; and this latter forms no small share of the task, whether constructed for the speed and flying propensities so essential in Leicestershire, Northamptonshire, or the best part of the Warwickshire country; for the compactness and strength so much better adapted for the deep country about the Worcestershire and Warwickshire woodlands; or possessing those qualities suitable for the Surrey hills, or the Gloucestershire walls, &c. There are no men more alive to the scarcity of such animals

than the farmers in Shropshire, Cheshire, Warwickshire, Northamptonshire, and Lincolnshire, and who, at the Stourbridge, Rugely, Rugby, Horncastle, and Lincoln fairs, were the purchasers of the well-bred, good-looking, three or four year olds, with them to undergo his years of tuition and probation, and, if not before sold to some neighbouring fox-hunter, to come again to market as a best-priced hunter. But how many horses come into a fair, at the present day, worthy being called hunters? Very few, I can safely assert; and most of these are wanting in some respect, either as regards performance or soundness. Dealers, who have to buy horses of character or quality, have to seek them in their owners' stables; and every man who has bought a few horses knows to what disadvantage he stands as regards the prices to be paid, when the owner has to be told, "You have heard he has a good-looking horse" (and this bit of flattery is necessary in many instances to get the chance of seeing him) "and would not object to sell him," for none place themselves in the position of *wanting* to sell a good-looking one now-a-days: it is something to get a refusal of him at his own price. I fancy this state of affairs augurs much of the scarcity of the animal.

I recollect when Shropshire, Warwickshire, Yorkshire, and Lincolnshire were wont to supply the majority of the hunters used in this kingdom, and I have but little doubt but at the present time more hunters are brought from Ireland to the English fairs than come to them out of our own country. Indeed, I think Ireland is getting an advantage over this country in the breed of horses, from the circumstance that mares for common purposes of breeding cannot here be sent to a first-class stallion, in consequence of the price being objectionable; it having become the fashion for the best stallions to cover thorough-bred and other mares at the same price, say from 10 to 25 guineas each; and these horses not being studded at every market-town, there is an additional expense for keep and travelling expenses, and the breeders of half-bred horses will not pay such sums. The result is, being under the control of his pocket, he loses all desire to exercise his judgment in the selection of a horse, and sends his mare to the nearest and cheapest horse in his neighbourhood. There are, it is true, owners of good horses who allow these mares to be served at half price, whose liberality ought to be considered a national boon; but even then it comes high.

It may be argued, that farmers are not so disposed to breeding horses as formerly. This is an instance of an evil working its own remedy. The best mares for these purposes having been taken out of the kingdom by the tempting prices offered for them, they have bred from what they could obtain at a less sum; and the result has been, that not one colt in twenty has turned out good enough to pay his expenses at five years old, which was formerly considered the best age to bring colts for sale (although now four-year-olds are very readily sold to the same hands; and thus, finding so little hope of a remunerating return, breeders decline practice. In other instances, the depreciated value of the colt has been in some cause of unsoundness that has not been discovered by the breeder until offered for sale, and which has, perhaps, existed from an early period of his life.

A breeder should be careful to look to any defect of this kind in mares, and particularly to watch their produce, to see if any like cause exist in them; otherwise, he may, at a ruinous expense, stock himself with a defective stud of young horses, and this to be discovered to his cost not until he come to sell them. I need not enforce the especial necessity of paying attention to the stallion selected. If a farmer be not judge enough himself in these matters, let him not grudge a fee to some competent veterinary surgeon; it will be money well laid out. By many, action is not noticed sufficiently in the selection of horses for breeding purposes. Since "like is apt to beget like," I would never put a mare to a bad goer. The difference in the value of a common horse is equal to 50 per cent.; but one of first quality, in other respects, enormous. Picture yourself on the look-out for a first-rate horse, either as charger, for the park, or harness. Walking through a fair, the very animal presents himself, coming into the town for sale. You get the refusal of him; price turns within your own estimate: he is fed, dressed, and pulled out for your inspection. After an anxious hour has passed, mark your disappointment at discovering he is a bad goer. You feel you would not buy him. Then, whose disappointment is greatest—yours, or the breeder's, who has never turned his attention to this part of his favourite's qualities, until, as in the case of unsoundness, he is reminded of it by the otherwise would-be purchaser? On the other hand, a dealer, knowing the nag you require, and believing, from your knowledge and love of action, he has what will tempt you, asks you to allow him to shew you one in the stable. You reply, on seeing him, "It is useless; he is not quite good enough." Still, from the desire of the dealer, you consent to have him out, more to satisfy him than yourself, when, to your astonishment, from his action, you cannot leave him. The price? Half as much again as you valued him at. Still, you must and will have him. Why should not the farmer be in this position? He cannot insure a good goer, it is true; but he should adopt every means possible to attain

one; and if he prove not, then sell him young, for some inferior purpose. I would recommend the same, likewise, in case of existing unsoundness, since a serious per-centage will have to be taken from the amount sold for as "sound," should he be certified to the contrary, when he comes to be overhauled by the veterinary surgeon, a scrutiny from which few escape when about to leave the dealer's hands. Many a young horse intended for harness might, under these circumstances, be put into the team at two or three years old, and thus earn his living at a time when his expenses are most serious, and be sold at five years old to pay well for his keep, up to the time he began to work, for van horses, which are much in request just now, for the purpose of delivery from, and collecting goods to, railway stations.

No bad goer or unsound colt is worth holding till four or five years old, unless he can earn his keep. Why has the dealer the good goer? Because he is on the look-out for such, and takes care to purchase, or have him promised to him, or some one employed by him, before he has reached the place of sale. It is astonishing what horses suffer, by comparison, when brought to market for sale. There are few persons who can carry those niceties of form in their eye that constitute what is termed *quality*, when deprived of the advantage of comparison, except the experienced dealer; and many feel astonished at such a man refusing to purchase what is considered by the breeder a fine cleanly-looking horse, until he comes to be compared with others, brought perhaps by themselves to a fair. Through comparison, the secret becomes divulged, it not being the practice of a respectable dealer to disparage what he does not intend to purchase.

It is true, foreigners take a vast number of entire stock out of the country; and I am of opinion it would be better if a limit were put to this practice, and so increase the trade for the foreign market, and enforce the breeding of them ourselves. But if they take the material, they not only produce what they require, but this country is deprived of the means of so doing, and thereby is the supply rendered scarce in cases of emergency. Further, they now take the very description of animals so much required by ourselves, as country stallions, their object being undoubtedly not so much the production of race-horses as the improvement of their studs. For general purposes, they are also careful in selecting their purchases free from any defect likely to be entailed on their progeny, or any natural formation that would predispose to such, both in mares and sires. It is to this weeding our cleanly sound mares out of the country, and leaving us the refuse, that I attribute the increased number of horses now with spavins, curbs, &c., more than was formerly the case; a circumstance that, in my opinion, calls for the especial consideration of government.

I shall now make some observations on the Queen's Plates and Racing, as they have had, and are likely to have, influence on the breeding of horses for the purposes previously mentioned. I do not think that these (racing) prizes were given solely for the purpose of increasing the amount of sport at different meetings: if so, the new scale of weights, and alteration in distance, will bring about—indeed *it has* produced—the desired effect. On the contrary, I have always looked upon them as being established for the purpose of causing the race-horse to be bred with the power to carry weight, and as an encouragement of adherence to that blood possessing the quality of endurance in the highest degree; and as the weights were previous to the late alteration, undoubtedly such prizes stood as a reward to the best horses in the kingdom possessing these qualifications. In former days, before such large stakes as are now raised by private subscription were run for, the amount bore a fair proportion with the sums contended for in other stakes, and then had the effect of bringing together moderate fields; but as the disproportion in these prizes to other stakes increased, so did the fields become reduced for the royal plates, it being not uncommon for a horse to walk over or meet with some insignificant competitor for a succession of these prizes. Even then, however, the prize went to the proper purse—that of the owner of the horse best qualified for these races, although the public felt some disappointment for want of competition. Now, I am an advocate that these royal prizes should be continued, not only on account of stamping the truly national sport of horse-racing with the highest character; but now knowing that, if placed upon a proper footing, they will answer the end intended, and which, in my opinion, is a material one. That the shortening the distances and lowering the scale of weights will produce the greatest amount of sport, as the prizes now stand, I do not doubt; but proceeding with this view alone will, I am convinced, give a disposition to the breeding of the race-horse for speed only, consequently leave unregarded the size and power necessary to carry weight, and particularly since most of the great stakes are handicaps. A weed of a horse, possessing speed, has many opportunities of winning a large stake, consequently there will not be that inclination to produce a more powerful animal, the means of doing which come more expensive; and therefrom arises a disposition or bias to breed from parents destitute of these qualities, if no further encouragement is held out to promote this end than now exists, viz., that of breeding the description of

animal destined for the general improvement of the race.

It would be folly to suppose that the present system of racing could be changed entirely. The object, as it now exists, is to increase the amount of speculation more than to improve the breed of horses, which, as connected with the turf, can only be effected by increasing the amount of these plates, and keeping up the weights. The distance (four miles) of many of the old plates I think rather too far with the higher scale of weights; nor do I approve of the system of running heats. If there be any cruelty in racing, as some choose to assert, it is in this, and this only. How often have I seen horses come to the post, to contend for a third or fourth heat, scarcely able to gallop from exhaustion through their previous efforts! I no more desire to see this than I admire seeing a bumpkin shaking and spurring a tired horse in the hunting field, or a beaten horse, whose chance is run out, in a steeple-chase.

I would propose to increase the amount of the royal plates, by removing them from places where the spirit of racing is not upheld by subscriptions from the inhabitants (who participate in the profit and amusement derived therefrom) to an extent to secure a proportionate amount of stakes to those contributed in other places, or, in other words, from where racing is not conducted and supported in its best and most spirited style; and by adding to the same prize, where such is the case, and so increasing the amounts instead of the number of the prizes. Suppose twelve royal plates of five hundred pounds each, one three-mile heat, weights high, but varying according to the severity of the course over which it is run, with a penalty of 7 lbs. for winning each stake in the same year; thus giving as many horses as possible a chance of winning one of them. This would be something like a reward for such animals being bred, and would enable the owner of a good horse to secure a fair share of the public money, although his means might he too limited to have engaged him heavily, as the more opulent proprietors of race-horses would have done at the age most of our great stakes require, and which, in most instances, as in the Derby, Oaks, and the great Produce Stakes, is before the merits of the animal can be tested. Out of this, I firmly believe, would arise a desire to breed an animal suitable for the purpose; and since there are other prizes of similar amount, where speed only is of importance, the retention of this property would always be considered, and carefully studied to be retained, and would, if effected, be the *ultimatum* of our object for the amelioration of that race of animal, the British race-horse.

Since it is from our thorough-bred stallions that our hunters, chargers, carriage-horses, and hacks are descended, the best formed and biggest are those which should be sought as sires for this purpose, there being a natural proneness to the primitive type, which is much less than the present race of blood-horses. When, however, I speak of a *big* horse, I do not mean the high, long-legged, narrow animal, but one in which the osseous system is capacious enough to afford sufficient space for chest, large levers, and attachment of a corresponding bulk of muscles; such a form that not only suits for racing, but, with slight modifications, almost any other purpose, from the hunter to the hack.

In breeding for speed only, that is, when powers of endurance are not kept in view, I am of opinion one of the most desirable qualities we can possess in horses for general purposes may be dispensed with in some degree, and in some instances to advantage; hence one reason why breeding such animals detracts from the essential qualities of the horse for useful purposes: I mean that form of body and chest known among horsemen by *a strong constitution*. How many good horses have I known on the turf whose legs have been sacrificed by the severe work requisite to prepare them; whose career, otherwise, would probably have been a long and brilliant one! Take Launcelot, Melbourne, Meteor, and many others I could mention, as instances; still they were the description of horse required for the general improvement of the race, and were race horses as well.

I do not think that Mr. Goodwin argues fairly when, taking the exceptions to prove his opinion instead of the rule, he states, that because Venison was a good race-horse and sire, that shape and substance is not a desideratum; although we are aware, if with this you have bad action, your hopes are frustrated. But Venison was not the "shabby" horse described by him; for his size, a more perfect animal does not exist.

When one of these exceptions prove first-rate for racing, or for any other purpose, it is because their action is superior to what is expected in such forms. And why not expected? Because it does not commonly exist.

It is common with racing men to observe, that they run in all forms: so they may; but the instances of a bad-shaped horse being a superior race horse are few. That they sometimes arrive at a high pitch in mediocrity, I admit; but still, the proportion the number tried of this sort bear to the good-looking, moderate-sized, true-shaped colt, is as fifty to one; leaving out those not thought worth preparing for a trial, it incurring no slight expense to know whether such an one is worth going on with or not. Hence the crowds of such horses in the kingdom, and the chance of one of them being

a moderate runner. I have come to the conclusion that the horses of this country (except for the purposes of racing as it now exists) are becoming reduced both in number and quality; and that this is mainly owing to the increased difficulty breeders experience in procuring good stallions for half-bred mares at moderate charges, and to our best-shaped sound mares being purchased for the foreign market. The same happens, also, with regard to our country stallions, those best adapted for that purpose being the very horses selected by foreigners, their government, or the societies for whom they purchase, enabling them to give such prices as empower them to take from this country the sound, good-looking animal with fine action; and so forcing breeders not possessing the means or inclination to pay the prices required for our first-rate sires, to put their mares to any common horse they meet with. And since most of those that travel, having good appearance and action, are either blind spavined, curby, or with some defect that makes the foreigners reject them, the result is, that in the next generation the country becomes stocked with mares the majority of which bear some of these defects. For I do not believe there was one-fifth of the unsound horses from these causes twenty years ago. And I contend, contrary to Mr. Goodwin's opinion, that trying to produce a good-looking horse, as understood by a horse-man, is not "to please the eye to impoverish the pocket;" but that the horse of moderate good size, and well shaped, is not only the best race-horse, but the best to get racing or any any other stock.

Look at our best stallions of the present day—Touchstone, Don John, The Provost, Sir Hercules, Hetman Platoff, and others of their class. Do *they* tell bad for the opinion herein advocated? Whereas, Venison, Sir Isaac, Colwick, and Picaroon, are about the only getters of race-horses of the contrary character. Colwick certainly got Attila, and Venison Alarm, both superior race-horses. But there have been as good, and a few more of them, got by better-sized horses. And it must be taken into account that Venison had as many good and tried mares as any horse in the country, and that these were the property of owners who engage the produce deeply; thus giving the chance, in case of a superior horse being got by him, of enormously swelling the number and amount of stakes won.—From the Veterinarian.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Weekly Council was held at the Society's house, in Hanover Square, on Wednesday, the 29th of March: present, Mr. Raymond Barker, in the chair; Sir John V. B. Johnstone, Bart., M.P.; Mr. Almack; Mr. Brandreth; Mr. Cherry; Mr. Cottam; Mr. George Dyer; Mr. Brandreth Gibbs; Mr. B. E. Hall; Rev. C. E. Keene; Mr. Kinder; Mr. Majendie; Mr. Parkins; Professor Sewell; Mr. Smith, of Burley; Mr. R. Solly; Mr. Stansfield, M.P.; Mr. T. Turner; Mr. Tweed; Professor Way; and Mr. Bullock Webster.

Dibbling. — Mr. Cottam, of 76, Oxford-street, favoured the Council with an inspection of Mr. Nichols's Hand-Dibbling Machine, and explained in detail the mechanical principles of its construction, and the peculiar advantages of its simple but most efficient mode of action: for which the Council voted to Mr. Cottam their best thanks. Mr. Smith, of Burley, stated that he was well acquainted with Mr. Nichols and the Dibbling-Machine of his invention then submitted to the notice of the Council by Mr. Cottam; it had been extensively employed in the county of Rutland, and he could bear the strongest testimony, from his own experience and that of his neighbours, to its practical excellence. Its peculiar advantages were derived from the double-action by which the seed was deposited and covered in with pressure at the same time; and it was adapted with equal facility to dibble seed of any size, from the largest seed ever used in dibbling down to the smallest turnip-seed.

Miscellaneous Communications. — From Sir John Lubbock, Bart., a report of Experiments in progress on the growth of Wheat and the comparative effects of artificial manures. From Col. Le Couteur, High Sheriff of Jersey, a report on a nine-years' trial of a variety of wheat from Chili. From Professor Way, a report from Mr. Lawes that he had not found the precipitated Sulphate of Lime obtained in the manufacture of Tartaric Acid (though in a highly comminuted state, to be purchased at a cheap rate and in great abundance) of sufficient value as a top-dressing to be recommended for the use of farmers. From Mr. Bullock Webster, a statement on the advantages of employing the waste-water on estates in hilly countries to the purposes of a motive power, by having it conveyed in pipes to turn a water-wheel, working an exhausting pump, and connected with a small oscillating engine. From Mr. Kinder, a request on the part of Mr. Lawes to be allowed to explain at a future meeting the experiments on Seed-Wheat and the effects of different manures, on which he had been so long engaged. From Mr. Smith, a report on Pleuro-pneumonia. From Mr. Glover, a copy of the report of the Newcastle Farmers' Club, containing the following communication from Professor Dumas, the celebrated French Chemist, on the result of his own inquiries and those of his colleague, M. Milne Edwards, on the use of Salt in Agriculture: "I quit England with the conviction that the problem of the employment of Salt in agriculture is chimerical. We have been sent from county to county without result. Here they send

us into the neighbourhood of the Salt mines; when we were there, we were told that salt was not a prophet in its own country. I am convinced that the most desirable mode of preparing a good manure is by employing the phosphates and ammoniacal Salts, rather than Sea Salt, however cheap the latter." Professor Way being present, begged to express his dissent from the general conclusion thus arrived at, even by Professor Dumas, for whose high character and standing in the chemical world, however, he entertained the sincerest respect.

Thanks were ordered for these communications, and the Council adjourned.

A Monthly Council was held at the Society's house in Hanover Square, on Wednesday, the 5th of April. The following Members of Council and Governors were present: Mr. Pusey, M.P., in the chair; Sir Francis Lawley, Bart.; Sir Robert Price, Bart., M.P.; Sir John V. B. Johnstone, Bart.; Mr. Raymond Barker; Mr. Barnett; Mr. Bennett; Mr. Bosanquet; Mr. Bramston, M.P.; Mr. Brandreth; Mr. Burke; Col. Challoner; Mr. Cherry; Mr. Garrett; Mr. Brandreth Gibbs; Mr. Grantham; Mr. Hamond; Mr. Fisher Hobbs; Mr. Law Hodges, M.P.; Mr. Hudson, of Castleacre; Mr. Jonas; Rev. C. E. Keene; Mr. Kinder; Col. MacDouall; Mr. Miles, M.P.; Professor Sewell; Mr. Shaw, of London; Mr. Shelley; Mr. George Turner; Mr. T. Turner; Professor Way; and Mr. Wilbraham.

Finances.—Mr. Raymond Barker, Chairman of the Finance Committee, presented to the Council the report on the state of the accounts of the Society to the last day of the month of March just ended, from which it appeared that the invested capital of the Society standing in the names of the trustees, had been increased, by the purchase of stock, from £8,999 to £9,889 stock in the public funds, agreeably with the official bank receipt, which the Chairman submitted to the Council. He also reported that the current cash-balance in the hands of the Society's bankers was £1,750 (made up of £965 as the special balance on the York subscription account; of £401 the amount of life compositions; and £31 that of arrears of subscription received; and of £353 as the remaining available balance for current purposes). This report was unanimously adopted.

Prize Essays.—The Chairman reported, on the part of the Journal Committee, the awards made in three classes of the Society's Prizes for Essays, which, on reference to the respective motto-papers, were found to be in favour of the following parties:—

I. The Prize of 50*l.*, for the best Report on the Farming of the East Riding of Yorkshire, awarded to George Legard, of Fangfoss, near Pocklington.

II. The Prize of 20*l.*, for the best Essay on the Cultivation of Hemp, awarded to Thomas Rowlandson, of Douglas-street, Bootle-lane, Liverpool.

III. The Prize of 30*l.*, for the best Essay on the Management of Grass Land, awarded to Robert Smith, of Burley-on-the-Hill, Rutlandshire.

York Meeting.—Sir John Johnstone, Bart., M.P., reported, on the part of the General York Committee, their recommendation that there should be a Council Dinner this year at the York Meeting of the Society, to take place on Wednesday, the 12th of July, and to consist of not more than 300 persons; the Committee deferring to a future meeting their recommendations of arrangements, by which such dinner may be made the means of advancing the objects of the Society, by the communication of practical views or facts of interest and importance to the members on that occasion; as well as their recommendation in reference to the question of a lecture or lectures on topics connected with agricultural improvement, to be delivered during the week of meeting. The Council decided accordingly that there should be a Council Dinner at the country meeting of the Society this year at York.

Messrs. Swann, Clough, and Co., of York, were unanimously appointed the local bankers of the Society during the period of the ensuing country meeting at that city in July next.

Consulting Engineer.—Mr. Parkes addressed a letter to the Council, expressing the sincere regret with which he felt himself under the necessity, on account of the great pressure of his other engagements, and his inability, from the circumstances under which he was placed, of drawing up such a report of the exhibition and trial of Implements at the Country Meetings of the Society as would be satisfactory to the Council, the exhibitors, or himself, of resigning the appointment, held by him so many years, of Consulting Engineer to the Society. Mr. Parkes added, that as his professional engagements were almost exclusively devoted to the permanent improvement of land by drainage, his efforts for the promotion of the useful objects of the Society would continue to be unabated. Mr. Shelley, and Mr. Miles, M.P., as Stewards of the Implement Yard at the Country Meetings of the Society, bore their cordial testimony of many years to the efficient and zealous manner in which Mr. Parkes, in his capacity as the Consulting Engineer of the Society, had devoted himself to the promotion of its objects; and concluded by moving and seconding respectively, that the best thanks of the Council be conveyed to Mr. Parkes for the services he had rendered to the Society; and, as a mark of the high estimation in which the Council held his scientific talents, that his name should be enrolled in the list of the honorary members of the Society. This motion was carried unanimously.

Judges.—Mr. Miles, M.P., in the absence of Mr. Milward (on account of severe indisposition), moved, and Mr. Shaw seconded, the amendment of which that gentleman had given notice, in the resolution for the nomination of Judges. The resolution, so amended, was accordingly decided by the Council to stand as follows:—"That any member of the Society who nominates a Judge be requested to certify, that of his own personal knowledge he knows him to be qualified and willing to act as a Judge *for the class for which he recommends him*; and who is unconnected with any exhibitor of stock or maker of implements, and has no direct personal interest in the stock exhibited, as the breeder of any particular animals upon which he might be called

upon to adjudicate. That the list of names so proposed (stating by whom proposed), be as heretofore referred to the Committee of the Council, whereof the Stewards of the yard of the year preceding be *ex officio* members. That in case a sufficient number of competent persons is not proposed, the Committee are ordered to add the names of such other persons as they may know to be competent and willing to act." On the suggestion of Mr. F. Hobbs it was decided that a classification should be made of the implements to be exhibited at the Country Meeting of the Society, in order that members in nominating Judges in that department, as in the case of Judges of Stock, may be enabled distinctly to recommend them for that particular division only, for which their practical experience has rendered them peculiarly qualified.

On the motion of Mr. Shelley, the Implement Committee were requested to take into their consideration the arrangements rendered necessary on the retirement of Mr. Parkes, and to report their recommendations on the subject to the Council at their next monthly meeting.

Cattle-yard.— Lord Portman gave notice that he should move at the next Monthly Council—"That on the Wednesday after all the awards are made in the Cattle-yard, Governors, in virtue of their subscription of £5 per annum, be admitted at the usual rate of entrance on the Thursday (namely at 2s. 6d.), and all other persons at £1 by tickets, to be obtained at the office of the Stewards of the Cattle-yard.

Country Meeting of 1849.—Memorials were received from places situate within the eastern district, connected with the country meeting of the Society to be held in that part of England next year. The following committee of inspection were appointed, with a request that they would visit the proposed localities, and make their report to the Council at their Monthly Meeting on the 3rd of May next, namely, Mr. Raymond Barker, Mr. Brandreth Gibbs, Mr. Jonas, Mr. Kinder, Mr. Shaw.

Country Meeting of 1852.—On the motion of Mr. Raymond Barker, seconded by Mr. Miles, M.P., the Council determined the district for the Country Meeting of 1852 to be comprised of South Wales and the counties of Monmouth, Hereford, Worcester, and Gloucester; and to be designated as the "South Wales district."

Bye-Laws.—Mr. Miles, M.P., intimated his intention, when moving an alteration of the time of the Council Meetings, at the next Monthly Council, of proposing "Monday at 1 o'clock" for the consideration of the Council, as the day and hour to which the alteration should be made from the present time of meeting. —Mr. Raymond Barker intended also to move an alteration in that part of the bye-laws which determines the amount of life composition for Governors whose subscriptions have been paid up to the end of the previous year; and proposed to substitute the sum of £30 for £50 as the amount of such composition.

Wheat and Manures.—Mr. Kinder intimated that Mr. Lawes would attend the next Weekly Council (on the 12th inst.), at 12 o'clock, for the purpose of communicating to the members a detailed statement of his experiments on seed wheat and the trial of manures.

The Council then adjourned.

A Weekly Council was held at the Society's house in Hanover-square, on Wednesday last, the 12th of April. Present — Mr. Raymond Barker, in the Chair; Sir John M. Burgoyne, Bart.; Sir John V. B. Johnstone, Bart., M. P.; Sir Robert Price, Bart., M.P.; Mr. S. Bennett; Rev. E. R. Benyon; Mr. Bosanquet; Mr. Cherry; Col. Challoner; Mr. R. Clutterbuck; Mr. G. Dyer; Mr. Eggar; Mr. B. Gibbs; Mr. Fisher Hobbs; Mr. Kender; Mr. Lawes; Mr Lawrence; Mr. Nesbit; Prof. Sewell; Mr. Shaw (London); Mr. Robert Smith; Mr. C. T. Tower; Mr. T. Turner; Mr. T. R. Tweed; Prof. Way; and Mr. H. Wilson.

Consulting Engineer.—Mr. Parkes addressed a letter to the Council, expressing the great satisfaction it gave him to find that the only motive which had induced him to resign the post of Consulting Engineer to the Society, had been deemed by them as honest and sufficient. He accepted with unfeigned gratification the highly flattering mark of distinction they had conferred upon him in electing him one of the honorary members of the Society; and it would be his constant and anxious endeavour to fulfil his duties with the same zeal for the interests of the Society, and the promotion of its objects, which he trusted had hitherto marked his conduct as an ordinary member, or as one of its officers.

Local Bankers.—Messrs. Swann, Clough, and Co., of York, addressed a letter to the Council, accepting the appointment of Local Bankers of the Society during the period of the York meeting.

Swedish Agriculture.—Count Athanase d' Otrante, of Nygard, near Söderköping, in Sweden, in transmitting through Mr. Tottie, the Swedish Consul in England, his composition as a life member of the Society, expressed to the Council the satisfaction it would give him to obtain for the Society any information connected with agricultural subjects which they might be desirous of obtaining from Sweden. The Council ordered their best thanks to be returned for this obliging offer.

Wheat.—Mr. Lawes, a member of the Society, residing at Rothampsted Park in Hertfordshire, and author of two highly interesting papers in the Journal on experimental results connected with agricultural chemistry, attended the Council on that occasion, for the purpose of explaining to the members the further results he had obtained, and of submitting to their inspection the specimens of Wheat produced in each case, as well as an analytical statement of their chemical differences. The Wheat from which all these samples were obtained was the old red Lammas variety, grown on his experimental farm at that place during the last four years, on a field of 14 acres which had been previously exhausted by the removal of four corn crops without manure; it was sown in 1844, 1845, 1846, 1847, the same space of ground being left each year without manure, while upon the rest of the field experiments with artificial manures from 20 to 40 in

number were tried. The conclusions Mr. Lawes drew from these experiments were, that while the acreage produce was increased by means of artificial manures to the double of that obtained from the unmanured space, the quality of the corn, or weight per bushel, and the proportion of the grain to the straw, were very much the same, both in the spaces which had various artificial manures, and that which had none. Great differences in the quality of the corn and in the proportion of straw were, however, to be found in the produce of various years, which he attributed to variations in climate during the years of trial. In 1844, when there was the fewest days' rain between May and harvest, there were for every 1,000lbs. of straw, 821lbs. of grain on the unmanured space, 892lbs. on that which gave the highest yield, and 870lbs. on the average of the whole experiments. In 1845, when the number of days' rain was above double that of 1844, the proportion of corn to 1,000lbs. of straw on the unmanured space was 502lbs., on the space most highly manured 569lbs., and the average on the whole number of experiments 500lbs. In 1846, the proportion of corn to 1,000lbs. of straw was on the unmanured space 797lbs., on the highly manured space 757lbs., and the average of 56 experiments was 770lbs. In 1847 the proportion of corn to straw was 590lbs., 569lbs., and 580lbs. Mr. Lawes considered that the weight of the bushel was determined by the temperature. The hottest year, 1846, gave the greatest weight per bushel, the coldest year, 1845, the smallest weight per bushel. In 1846 the bushel of the unmanured space weighed 63¾lbs., of the highly manured space 62¾lbs., the average of 36 experiments was 63lbs. In 1845 the bushel of the unmanured space weighed 56½lbs., of the most highly manured space 57 lbs., the average of the whole being 56¾. Taking into consideration the extremely artificial nature of the experiments, and the comparatively small differences observable, Mr. Lawes thought it might be assumed that in ordinary agriculture the influence of manure upon the quality of the grain, and the proportion of that to straw, were very small compared to the differences effected by variations in climate. He then referred to the opinion generally held by chemists respecting the composition of grain. It had been said that the nitrogen or nutritive elements of grain could be increased by supplying the soil with substances rich in nitrogen. The samples of corn which he then exhibited were, some of them, grown by means of mineral manures, and some by minerals with large quantities of ammoniacal salts. The sample of corn grown by superphosphate of lime gave, upon analysis, 3.03 per cent. of nitrogen; when ammonia was added, the per-centage of nitrogen was only 2.65. Liebig's Wheat manure, composed of mineral matter, gave 1.81 per cent. of nitrogen; when ammoniacal salts were added, only 1.69 per cent. A sample of Wheat, grown in Australia, of remarkably fine quality, gave 1.94 per cent. of nitrogen. Another of indifferent Wheat, grown on the borders of the Black Sea, and employed in making the finest description of maccaroni, gave 2.71 per cent. of nitrogen. He then concluded by remarking that, while the produce is greatly increased by the employment of ammonia, it appears that the per-centage of nitrogen in the grain is rather diminished. That under a proper temperature, starch is accumulated by the influence of ammonia, and that in general those Wheats which bear the highest price are comparatively poor in nitrogenous compounds. —Colonel Challoner inquired of Mr. Lawes the time and mode in which he applied artificial manures to his crop, and was informed that they were all drilled in below the seed at the time of sowing—an arrangement which was found by Mr. Lawes to produce the most regular effects in the growth of the plants, and he had reason to believe that the soluble manure was not washed out, as commonly supposed, by the rains occurring during such long period of its remaining in the ground; but that the manure so deposited along with the seed, assisted materially in affording support to the young crop during the winter season.—Mr. Bennett having ascertained from Mr. Lawes that his land was a Wheat soil resting on a chalky subsoil, stated that, had Mr. Lawes's land rested on a wet clay, he thought it probable, from his own experience, that there would have been found less straw and corn grown upon such land in a wet season.—Colonel Challoner then gave an interesting statement of the mode in which the Wheat intended in the south of Italy for the manufacture of maccaroni was managed. He stated that the best maccaroni was made between Naples and Salerno, and was known there by the name of "Maccaroni della Spiaggia." It was made from Wheat of the finest quality, and the grain after being threshed out (generally in the fields), was carefully spread out upon the flat roofs of houses, during the hot weather, and there left exposed to the sun during the day, and to the dews of the evening and the early morning, for a fortnight or three weeks; until, by these means, it had become quite hard and dry. It was also known by the name of "Maccaroni della Zitta."—Mr. Clutterbuck believed that in Australia the order of preparation for the Wheat crop was ploughing and a fallow, and that after the crop the straw was burnt on the land, when there was a repose for a year, then another crop, and so on; on which Mr. Lawes remarked, that in the year 1846, when there was the nearest approach to an Australian season, his Australian Wheat had succeeded the best.—Sir John Johnstone favoured the Council with a statement of experiments which he had made on a fair good Wheat soil, which came into his hands in a foul and exhausted state, in reference to the value of Liebig's patent mineral manure: that manure was found to produce the smallest results in comparison with the other artificial manures he had tried along with it, as shown by the tabular statement given in the last Part of the Proceedings of the Yorkshire Agricultural Society.—Mr. Nesbit conceived that both organic and inorganic manures must be employed in conjunction, as either alone would eventually diminish the crop.—Mr. Tweed favoured the Council with the results of his experience on the growth of Wheat.—Professor Way considered that the agricultural public was much indebted to Mr. Lawes for his valuable investigations. He had

read with great benefit the excellent papers of Mr. Lawes, published in the Journal of the Society, and although there were some views in which he could not entirely coincide, he felt convinced that Mr. Lawes was pursuing a system of inquiry which must ultimately elicit the true principles of agricultural science. Mr. Lawes had brought forward facts calculated to encourage the agriculturist in all reasonable hopes of improvement, but at the same time to dissipate the illusory notion that he could at any time become independent of season and climate. Mr. Way wished to correct an impression which appeared to have got abroad that the results of Mr. Lawes' experiments were entirely subversive of the principles of supplying to the different crops mineral manures after the composition of their respective ashes. It was quite true that those researches went to prove the impossibility of obtaining an agricultural result by the use of mineral substances alone, unless there were an abundance of matter in the soil capable of yielding the ammonia and carbonic acid necessary for vegetable growth. But Mr. Lawes had himself pointed out that a period had arrived in his experiments when the use of ammoniacal salt was no longer capable of producing a crop, and when it became necessary to supply artificially the mineral matter carried off by the successive crops. It was, therefore, far from Mr. Lawes' intention, he believed, to deny the interest and importance of a correct knowledge of the inorganic constitution of agricultural plants. Mr. Way also made some remarks upon the failure of Liebig's manure: he considered that in seeking to render the alkaline salts more permanently available to vegetation the mark had been overshot, and that the manure was not sufficiently soluble for the wants of the crop to which it was applied, at least he judged so from a sample he had himself analyzed. This might be rectified by slight modifications in the relative proportions of the ingredients, and the process of its manufacture.—The Council then, on the motion of Colonel Challoner, seconded by Mr. Fisher Hobbs, voted to Mr. Lawes their best thanks for the very interesting explanation which he had furnished them of his important experiments.

Bearded Wheat.—Mr. Halcomb, of Poulton, near Marlborough, reported to the Council the success with which he had cultivated a new variety of Bearded Spring Wheat, adapted for soils not suited to Barley, or for late sowing after Turnips, from seed furnished to him by Mr. Elliot, of Jedburgh, in 1840, originally obtained from Mr. Dickson, of Hawick, by whom it had been introduced into Scotland from Russia. Mr. Halcomb put a portion of this seed into the ground on the 18th of March, and the remainder into an adjoining piece of the same land on the 3rd of April, after a crop of Turnips fed off by sheep, and ploughed for seed early in March. The earlier sown was reaped on the 15th August, and the later sown on the 18th of the same month, having begun also at the latter date to reap his autumn-sown Wheat. Apparently there was no difference in these crops; but on threshing them the produce of the autumn-sown proved to be only 33 bushels per acre, while that of the spring-sown was 40 bushels. He had sown this new spring variety every year since, and had generally the same quantity per acre as from the autumn-sown Wheats. He had never found the crop deficient, excepting when he had been unable to get a fine tilth, after feeding off turnips with sheep, with a subsequent dry summer. In a trial last spring, Mr. Halcomb grew in the former case, from 2 bushels of seed per acre, 32 bushels; and, in the latter, from 3 bushels of seed per acre, on the adjoining ridge and sown at the same time, 40 bushels of grain, which proved, to his surprise, of superior weight by 7lbs. per sack. He had never grown more than 41 bushels per acre of this Wheat, but he had been told by other parties of their having grown, on superior land, 48 bushels, and, in one instance, 56 bushels. The price of this new variety in Devizes market was usually rather above that of the autumn Wheats. Mr. Halcomb conceived that its greatest advantage would be found in its suitableness for soils subject to blight. The last season, on land where the autumn Wheats were scarcely worth cutting, the "April" Wheat, to which Mr. Halcomb then called the attention of the Council, was estimated at 40 bushels per acre. He thought, also, that from its early maturity it would be found serviceable for making good deficiencies of plant in the autumn-sown.—The Council ordered their thanks to be returned to Mr. Halcomb for the favour of this communication.

Barley.—Mr. Harries, of Llanwnwas, near Haverfordwest, favoured the Council with a report on the growth of a variety of Barley he had discovered in a field of skinless Barley from seed furnished to him by the late Rev. Mr. Rham, and which he had found very productive. In the autumn he could furnish a supply of the seed. Mr. Bennett was acquainted with a kind of Barley very similar to that transmitted to the Council by Mr. Harries; but he feared, from his own experience of its character, that it would not be found a variety of any value.

Flax.—Mr. Robinson, of Belfast, called the attention of the Council to his new process for steeping, breaking, and scutching Flax; and as he intended to exhibit his apparatus in full action at the ensuing York meeting, he solicited of the Council the favour of adequate means and opportunity being granted to him, in order that he might effect that object. He hoped by his new process to show that raw Flax could be rendered fit for the market, or for the mill or hand process, in one fifth of the usual time. The Council directed Mr. Robinson's letter to be referred to the stewards of the implement-yard at the York meeting.

Reaping Machine.—Mr. Hussey, of Baltimore, U.S., requested that his reaping machine might be subjected to trial in England under the orders of the Society. The Council directed that Mr. Hussey should be informed that he was at liberty to enter his machine for the York meeting of the Society, when it would be subject to trial at the discretion of the stewards and judges of the Show on that occasion.

Tile-kiln.—Mr. Charnock, of Wakefield, transmitted to the Council a plan and description of the model

of a tile-kiln, exhibited by him at the Scarborough meeting of the Yorkshire Agricultural Society, for the Earl of Tyrconnel's Prize offered for the best plan of tile-kiln on that occasion. Thanks were ordered to Mr. Charnock for this communication.

Steam-draught for Ploughs.—Mr. Cherry, of Clapham-common, Surrey, informed the Council that, in addition to the statements he made at a former meeting in explaining the operation of the apparatus for steam-draught for ploughs, which he exhibited to the Council, he had further to state, that great facilities may be obtained by the proposed arrangement in carrying on the operation of subsoiling, without exposing the subsoil, after having been loosened and rendered pervious by such process, to be again consolidated by the treading of horses employed in turning a succeeding furrow.

Draining.—Mr. Fisher Hobbs thought the Council would be glad to know that among the practical good results of the Newcastle Meeting of the Society, one had occurred from a casual circumstance which had furnished the farmers of that neighbourhood with a striking and tangible proof of the advantages of draining, a fact which had been communicated to him by Mr. Ramsay, a Member of the Society, who had felt a deep interest in the progress and success of that Country Meeting. By the requirements of the Society, it was necessary that the site of the Show-yard on the Town Moor at Newcastle should be drained sufficiently to prevent any inconvenience for the purposes of the Exhibition, should the weather at the time of holding the Meeting have proved unfavourable, and much rain have fallen. Such was the repugnance of the freemen at the breaking of the ground for this purpose, and the violation of their common rights in the supposed lasting injury that was in that manner about to be inflicted on their property, that it was only after the most obstinate struggle, and the united remonstrances of the authorities of the town, that such operation was allowed at length to be effected, agreeably with the regulations of the Society. The time had passed by, and the struggle was almost forgotten; but the area of common so drained (although not perhaps in the most complete manner, according to the experience gained at the present day) had remained a lasting instance of the striking effects produced by that drainage. The Steward of the Herbage Committee, as well as many of the freemen, had now signified to Mr. Ramsay their entire conviction of the beneficial effects of draining, in consequence of the decided superiority of the grass on the drained portion over that on the remaining undrained portion of the Town-moor. Mr. Hobbs further remarked, that, as an instance of the results attending the draining of a stiff soil, this casual circumstance had wrought a very favourable change in the opinions of many of the farmers in the neighbourhood.—Mr. Brandreth Gibbs, as the Director of the Show-yard at the Newcastle meeting, fully corroborated this statement.

Deodorising Liquid.—Mr. Tower, of Weald Hall, Essex, called the attention of the Council to the good effects he had found to arise from the use of the deodorising liquid of Mr. Ellerman, the component parts of which, according to the analysis he submitted to the Council, could not, he thought, but render the use of this preparation valuable as an agricultural as well as a deodorising agent.

Wireworm.—Mr. Dickinson, of Curzon-street, favoured the Council with the result of his endeavours to eradicate the wire-worm from his Italian Rye-grass, of which it had previously, on the small plot of ground, destroyed three crops. This result was attained by the application of volatile alkali as it exists in guano. This communication was received with the best thanks of the Council, and referred to the Journal Committee. Mr. Bennett believed that the wire-worm was fonder of the root of the Rye-grass than of that of any other plant; and he had always understood that the great drawback in the cultivation of Rye-grass was the harbouring it furnished to those infesting insects. He considered, therefore, that this would prove an important discovery of Mr. Dickinson, should the same result be uniformly obtained. Sir John Johnstone thought it desirable to ascertain whether the remedy would be equally effective in other cases; for instance, in that of a Clover-lay turned up for Wheat. Prof. Way had no doubt that the Clover disease was the ravage of an insect. Mr. Lawes conceived that it was in all cases owing to the unhealthiness of a plant, and an excess of organic matter, that worms and insects infested different crops.

Vetches.—Mr. Bury, of Hanslope Park, in Buckinghamshire, reported to the Council the fatal effects of a single feed of meal from Vetches, purchased at Liverpool, on nine of his pigs. The meal was made into porridge and given to the pigs the same evening; they were all found cold and dead on the following morning. —Prof. Way remarked that this poisonous effect was produced either from mineral poison mixed with the meal, or in consequence of some poisonous quality chemically engendered in the meal itself. He was inclined to think, from such a result in many vegetable substances, that the latter was the case.—This view was corroborated by Mr. H. Wilson, of Stowlangtoft Hall, who informed the Council that two of his fat porkers were both destroyed by having been fed for a week on meal ground from damaged rice, purchased at a cheap rate, and its feeding qualities tried as an experiment upon the pigs in question.—Mr. Hobbs had found Vetches unfavourable, unless given with other food, and he conceived that no crop exhausted the land so much as Tares.—Mr. Bennett regarded Tares as an injudicious food for any animal. He spoke from his own experience, having used them extensively at one time for his sheep. The Tares he had used were the cheap foreign Tares of the market.

Dibbler. — Mr. Hodgkins, of Chipping-Norton, transmitted a statement of the peculiar advantages of his hand seed-dibbler, for which attention the thanks of the Council were ordered.

Presents.—Thanks were ordered to Mr. Nicholls, for a copy of the new edition of his "Flax Grower;" to Mr. Hume, for a copy of the last Report of the Guernsey Agricultural Society; to Mr. Bullock Webster, for his present of Trug-baskets (cheap, light, and

durable, as he described them, for farm or garden use); and to the donors of other presents to the Society.

The Council then adjourned, over the Easter Recess.

The following communications were received after the Council had broken up.

Pleuro-pneumonia.—Mr. Milward, a Member of the Council, residing at Thurgarton Priory, Nottinghamshire, enclosed for the information of the Members the following statement of treatment of cattle in cases of pleuro-pneumonia, which he stated had not been known to fail in a single instance, in effecting a recovery of the animal suffering under its attacks. The statement was copied from a letter received from Mr. Clater, of East Retford, a name well known and appreciated as connected with a popular work on the diseases and treatment of cattle, which has already passed through nine editions.

"On the *first appearance* of the disease, bleed freely; then give ½lb. of Epsom salts, 4 oz. of sulphur, 1 oz. of nitre, and 2 drachms of emetic tartar, in 3 pints of gruel. Keep the animal warm and clean. Should the symptoms not appear to abate in 12 hours, give the following drink: ½ oz. of nitre, 1 drachm of camphor, 1 drachm of emetic tartar, and 2 drachms of powdered ginger, in a pint of gruel; and repeat this drink every 8 hours until the oppression in breathing has nearly subsided. If the bowels do not act properly, repeat the first drink in 3 pints of gruel, omitting the emetic tartar. Feed sparingly on bran-mashes, grains, and gruel, with crushed linseed; but with no roots, if there be any inflammation."

Hove in Cattle, and Colic in Horses.—Professor Sewell, of the Royal Veterinary College, begged to observe, in reference to the cases of death arising from the meal of Vetches, that as animals frequently die soon after eating any particular kind of food, or even their ordinary kind of the best quality, it must not be inferred that such meal of Vetches contained poisonous matter. The result more commonly ensued from too much ordinary food being given at feeding time, or from voracious feeding on fresh succulent food obtained by the animals out of doors, or on that which is brought to the homestead and given immediately in its fresh state. He had known it occur from want of a sufficiency of water to moisten and dilute the aliment, and in some instances from offensive water which the animals refused. From either causes death often supervenes in a few hours, in some cases immediately. The evolution of gas is very rapid, distending the stomach, which, pressing forward on the lungs, impedes respiration and the action of the heart, an obstruction to these important vital functions, which combined with excessive irritation in the stomach, soon leads to a fatal termination. Meal acts differently, according to its weight and glutinous quality. He had seen it produce severe symptoms of acute indigestion in stalled bullocks, from not having been mixed with a sufficient quantity of cut chaff, which requiring mastication, caused a more gradual process of feeding, and promoted digestion. Very few farmers or owners of any kind of stock, he apprehended, had not at some period suffered losses from the foregoing causes, called hove in ruminants, and colic in horses. The first, he stated, was readily relieved by introducing a hollow probang through the mouth into the stomach of the animal, or by piercing the animal on its left side with the German trocar. This practice, he remarked, did not avail in the horse, but medicines well known to most scientific practitioners might be supplied and kept in readiness to administer, and which usually were found to succeed; but if a case became protracted, inflammation commenced, which required the practitioner's judgment to combat. Mismanagement and irregular feeding sometimes led to fatal results without the cause being suspected. He had himself observed this in the public service as well as in private stables. He was called upon on one occasion to examine two horses of a team of four that had arrived off a journey at midnight, and were supplied with an undue quantity of good Oats, but neglected to be watered. Distention and irritation of the stomach ensued in both cases, and terminated fatally in less than six hours. An Essex farmer, in the neighbourhood of London, who sent produce of various kinds to the markets, requested Professor Sewell to investigate the cause of his losses, and gave him a list of the names of *ninety horses* which had died within two years. He found, upon inquiry, similar mismanagement, namely, too long fasting between the feeding times, and the frequent return of provender allowed, and sent to be given in feeding-bags at noon while from home, with similar consequences. Upon a change of hands, and instituting a careful superintendence, the losses ceased. He could quote many other instances of disease and death which might have been averted by system and good management. Professor Sewell presented to the Society, along with this communication, one of the trocars, or puncturing apparatus, to which he had referred. It consisted of a sharp stiletto sliding through a cylindrical case or sheath, on the sides of which were several openings for the escape of the gas. This instrument was intended to be thrust (stiletto and sheath together) through the animal's hide, into its rumen, or first stomach, and the stiletto then withdrawn, when the distending gas would rush through the lateral apertures of the sheath (left perforated in the skin and stomach) and thus rapidly make its escape. The trocar presented by Professor Sewell was made of German silver, at a price of 12s., but it would answer equally well made of brass, and, in that case, would cost only 5s. Professor Sewell remarked that it was adopted for neat cattle and sheep, and ought to be in the possession of every farmer.

NEW MEMBERS.

Albright, Arthur, Edgbaston, Birmingham
Bright, Dr. John, Manchester-square, London
Chambers, Dr. W. F., Brook-street, London
Connel, Dr. (2nd Life Guards), Montpelier-square, Brompton
Day, Francis, Priory, St. Neot's, Huntingdonshire
Dickinson, John, Red How, Cockermouth, Cumberland
Eames, James, Beck Farm, Beaulieu, Southampton
Green, James, Wroxham, Norwich

Hensman, William, Woburn, Bedfordshire
Hensman, William, jun., Woburn, Bedfordshire
Hole, James, Knowle, Dunster, Somerset
Kidstone, Thomas, Prospect Hall, Ricksmansworth, Herts
Lowndes, William Layton, Binfield, Berkshire
Michelmore, Thomas, jun., Berry House, Totnes, Devon
Norris, Rev. G. P., Roscraddoc House, St. Cleers, Liskeard
Owen, John, Broadway, Churchstoke, Salop
Parker, Thos. Townley, Sutton Grange, St. Helen's, Lane
Pippet, William, Downside College, Bath
Poulton, William, Head Master of the Norwich Diocesan School, Aylsham
Richardson, George, Bridlington Quay, Yorkshire
Sherriff, William, Treworgan, Monmouth
Sheringham, William, Fakenham, Norfolk
Winn, Rowland, jun., Nostell Priory, Wakefield.

AGRICULTURAL STATISTICS.

BY J. TOWERS, MEMB. R.A.S., H.S. OF LONDON, &c.

A subject which has been a good deal agitated during the last two or three years, but involved in so many difficulties that it appears as if by understood consent to be pretty well abandoned by all. If I rightly understand it, the object proposed was to obtain, by a universal and individual "stock-taking" (if the term be allowed), a report of all the grain-stock or produce of the farms in the United Kingdom, at a certain period of the year after the in-gathering of the corn crops: from which report the entire produce of the country might be ascertained. Were it possible by one simultaneous operation to arrive at such a result, great good might follow; the actual condition and amount of the stores would be determined; and the acreable produce of the land being thus ascertained, the question of supply and demand would be fairly stated and solved.

But the thing is impossible; for, admitting that by parliamentary enactment each farmer were required to bring forward his statement, yet the ability to enter upon the calculation does not sufficiently exist; and before one universal system of agricultural book-keeping could be brought into action, each and every farmer must become a correct accountant. At the same time it is evident that there are other reasons more cogent, which would urge an inquiry into the subject of productive supply; for it is plain that if we could ascertain, in detail, the amount of seed sown, and that of grain returned, two great facts would be brought to light, viz., the comparative merits of thin, intermediate, and thick seeding, and the crops resulting from high and lower cultivation. It is quite certain that from land of extremely poor quality, reposing upon a subsoil of debased character, by assiduity and deep comminution, great and remunerative crops have been and are annually obtained—far exceeding those on other staples, by nature of first-rate quality, but upon which no adequate labour has been bestowed. In the perfect loams of West Somersetshire, about Taunton and Bridgewater, crops are produced that would disgrace a farmer whose land is so poor, stony, and intractable as to require his utmost and continuous exertions.

As it is evident that statistical knowledge is most desirable, and equally so that this cannot be obtained either by legislative interference or by individual calculation, we have only to inquire how some advances may be made in a right direction towards an object which is now admitted to be of national importance.

We are only on the threshold of agricultural science; and that being the case, the very first step should be *educational*; and as desultory experiments reported by the periodical press lead to conflicting results, from the multitude of facts that stand in direct opposition one to the other, no hope remains but in the general establishment of *experimental farms*. The idea was formed many years since, and a few such establishments are already in process; but if we desire to acquire clear evidences of what the nation *could* produce, each county ought to furnish an example-farm so extensive as to comprise, or to be able to introduce every kind of soil with which that county chiefly abounds. The variety of soils and their arbitrary interposition produce some of the chief difficulties with which the chemist has to contend; yet a thorough knowledge of constituents must be acquired ere anyone can discover the nature and quantity of the inorganic elements that his land comprises. I lay small stress upon the organic elements, because they consist wholly of matters formed by decomposable vegetable or animal substances which are finally resolvable into the four gases—oxygen, hydrogen, nitrogen (or azote), and carbonic acid. These substances can be and are supplied artificially by manures and *carbonate of ammonia*, which assumes the gaseous form rapidly by heat, and though more slowly, yet certainly at ordinary temperatures, is supplied by the atmosphere; but the inorganic elements, whether metallic or earthy, can only be detected by rigid chemical investigation. Hence agricultural chemistry of the highest order must be made the primary consideration.

Let us be convinced of this truth by alluding to the potash and phosphates that exist in loam, the presence of which was not even suspected a few years since. What practical farmer could undertake any process by which these minerals might be eliminated, and their quantities determined? Who but a chemist could have detected the phosphoric-acid of the green-sand strata, that has recently excited so much interest?

Processes so delicate, so refined and costly—yet indispensable—can only be performed in the laboratory of an institution; therefore agricultural analytical chemistry must constitute the leading principle. The native earths being once clearly understood, the question of manure must be determined by the organic analysis of several crops of the land, repeated so often as to insure, at the least, a close approximation to correct deductions: then, and not till then, can we attain a sound theoretical principle of cultivation. The work is in progress, but its sphere must be greatly enlarged. The Edinburgh Chemico-Agricultural Society, under Professor Johnston, presents an admirable type and model: and were a hundred of such elementary laboratories, with ample breadths of land, in active operation, we might hope very speedily to arrive at trustworthy statistical results.

Having thus generalized, in proposing the fundamental bases of that science which alone can establish certain results, it remains to advert to a few particulars:—

First—The properties of every kind of soil and subsoil within the area of each farm should be chemically and mechanically ascertained; and so far as possible, the ground be laid out in true or oblong squares, of extent proportionate to the intended objects.

Secondly—Draining, subsoiling, and additions of earth (if required) should be made, until a labourable bed, fully 24 inches deep, be obtained.

Thirdly—Seeding and cropping suitable to the staple should be made with the utmost accuracy, registers being kept of every minute particular, so that no possible doubt as to quality or quantity might exist.

Fourthly—The "courses" of cropping, with ultimate definite objects, should be carefully laid down and rigidly observed.

The varieties of soil will be found, as I have said, one of the main obstacles; and these occur at distances frequently little remote. On experimental farms, however, where *ample* funds must of necessity be at command, there will exist little difficulty; and as every exertion must be made to detect results, facts will come to light which will greatly remove uncertainty. We as yet have *no principles*. Experiment alone can establish them: therefore we feel it an imperative duty to urge those who possess influence to establish farms upon the plan proposed, without loss of time; because, as population increases with startling rapidity, it behoves all, who feel that a produce of two-and-a-half and three quarters of wheat per acre will soon be found inadequate to supply the natural demand, to determine by actual experiment the means by which all farmers, by the adoption of adequate means, may produce those great and increased crops that some men of indefatigable energy can and do command even from land of very poor quality. Having endeavoured to show that we possess the means to arrive at certain conclusions on farms instituted for the express purpose, it only remains to prove that, so far as such farms are concerned, the results may be calculated with very great precision; and, thus far, the statistics of agriculture may be established. Again, if county farms, with a given number of pupils, were in action, a number of young men, highly cultivated in agricultural science, and well drilled in practical field operations, would progressively be given to the public, ready to disseminate the invaluable knowledge they had thus acquired. The work of instructing an empire must of necessity be slowly progressive; but the foundation so laid, being sound in principle and practice, must, under the blessing of Heaven, be secure and permanent; and with that blessing agriculture, as a national science, would become rich, and "no sorrow would be added to it."

SPEEDY ABOLITION OF THE SMITHFIELD MARKET NUISANCE.

(FROM A CORRESPONDENT.)

At last, and not before time, the monster nuisance of the metropolis, it is said upon authority, is to be abated. Why it has been suffered to last so long, against the wishes of nearly every grazier, and to the proved loss in the quality of the cattle—goaded, bruised, fevered, maddened—to the extent of £64,000 per annum, is more than any sane man can suggest. The Corporation of London, it appears, nett less than £4,000 by the continuance of this nuisance, and might nett much more for ground rents in a handsome street or square on the six acres upon which the legal and illegal market stands.

In addition to the understood determination of Government, a body of gentlemen are establishing a joint stock company, which, as an investment, bids

fair to be one of the most profitable in existence. Their object is to re-introduce the Islington Cattle Market, without any of the objections that were made to the late Mr. Perkins's plan and proceedings; but, as they have prepared a powerful address, it is perhaps better to allow them to state their case in their own words—

The object of this Company is to provide a large and convenient market for British and Foreign cattle sent for sale to the metropolis; commodious abattoirs for the slaughtering of such cattle; excellent lairs for their repose after travelling or remaining unsold; and a Dead Meat Market, with a frontage of upwards of two thousand feet immediately adjoining the Cattle Market.

Two classes of gentlemen will support this undertaking: one for great public objects, because it abates the gross and growing nuisances of Smithfield, benefits the cattle, prevents impure meat being occasioned by cruelty, and then sold and eaten; removes from crowded thoroughfares danger often, and fear and alarm always; gets rid of a fruitful source of malaria, producing countless diseases from the stagnant blood and offal of slaughtered animals, and puts down the greatest disgrace of this metropolis—a nuisance unparalleled in the capital cities of every country in the civilized world.

The other class of its supporters will be those who will join it as the safest and most profitable investment existing or projected on a joint-stock principle, seeing that it has already obtained the sanction of the Legislature, which has been repeatedly refused to any extension of the ancient narrow boundaries of Smithfield; and that its business must annually increase with the annual increase of the British and Foreign cattle bought, sold, slaughtered, and consumed in London.

A rapid glance at the estimates, which have been most carefully prepared, will show that without many minor sources of income unspecified, there must be on only half of the cattle, sheep, dead meat, &c., at present sold, killed, or eaten in the metropolis, a profit of no less than 25 per cent. per annum, with an ultimate increase to from 50 to 60 per cent. per annum

Nor will this appear surprising when it is known that this Company have all the valuable buildings, pens, offices, houses, &c., erected by the late John Perkins, Esq., on upwards of twenty acres of freehold land, and leasehold land (in addition), with the Act of Parliament conferring the privilege of holding markets, taking tolls, &c., at less than one-half of the amount expended by that gentleman, and without the long and fierce battle fought by him with a body of monopolists then banded together like scales on the back of a serpent.

That gentleman is dead, and many things are favourable to this company which were unfavourable to him. A prejudice got abroad, and was most industriously seized upon and circulated by the interested supporters of the nuisances of Smithfield, that while fighting one monopoly he was seeking to establish another. Some erroneous, and it is believed misconstrued proceedings on his part were alleged as reasons for this report; but now that a body of gentlemen for the public good, and another body of gentlemen for their private profit, combine together, no monopoly or selfish advantage to the public injury can arise, and every error which past experience has pointed out will be removed, and never more be allowed to exist. Three instances may be cited in proof: 1*st*, *The establishment of a dead meat market adjoining the living cattle market*; 2*ndly*, *Full and free permission to purchase hay, fodder, &c., either from the company or from any one else*; *and* 3*rdly*, *Full and free permission to slaughter, wholly or in part, in this establishment, by the company's servants, or by the servants of the different carcase butchers, as they may from time to time prefer.*

As to the business that has been done in Smithfield, and that may be expected in Islington, certain evidence taken before a select committee of the House of Commons last year will furnish *data* to throw abundant light upon.

It appears that Smithfield, when originally granted for the purposes of a cattle market, and long after, bore about the same position to the thickly-inhabited parts of London that the new cattle market at Islington does now. It then was, and now is, legally confined to an area of about four and a-half acres; in which space a century ago, in the year 1746, about 75,000 cattle and 580,000 sheep, with probably a few pigs, were sold. In 1846, in the same Smithfield, and in an illegal enlargement of it,* neither sanctioned by Royal Charter nor Act of Parliament, were sold 233,402 head of cattle and 1,527,220 sheep, besides about 250,000 pigs; making an increase in the last century alone of considerably more than cent. per cent. What that increase may be with the continually advancing importation of foreign cattle, in a few years longer, no man can tell. But what sane man will say that Smithfield, both legal and illegal, can hold many more than at present?—and if it could, with the growing hostility of the inhabitants of the thoroughfares through which these cattle must be driven, the determination of Government to support all such sanatory measures as will get rid of malaria, typhus fever, cholera, &c., arising from putrescent animal matter, stagnant and stinking animal blood and offal, such as are seen and felt in and around Smithfield,† and the universal ridicule with which the continuance of this monster nuisance is met by enlightened writers, both at home and abroad, that the time has not already arrived when Smithfield must cease to exist as a market for cattle any longer?

Still, as in all changes, however imperative, the opinions and wishes of the parties concerned ought to be

* See the opinions of the Recorder, Common Sergeant, &c., declaring such enlargement unlawful, and subjecting parties buying and selling to criminal proceedings.

† Among the rolls of Parliament of the year 1380, a petition occurs from the inhabitants of Smithfield and Holborn, against the butchers of Butcherhall-lane, praying that some penal ordinance might be enacted, to restrain the nuisance of throwing the blood and entrails of slaughtered animals into the channels connected with the river Fleet; and that the butchers might be forced to kill their beasts at "Kynghtsbrigge," or elsewhere, away from the annoyance of the people, under penalty not only of forfeiting such animals as might be killed in the "bocherie," but of a year's imprisonment. The prayer of the petition was granted, and its penalties enforced for several reigns.

consulted, it was deemed expedient, before absolutely concluding any arrangement for the possession of the Islington Cattle Market, to ask for and be governed by the opinion of the many thousand graziers who transmit their cattle for sale in London, as to whether they would prefer the one market or the other. Accordingly a circular was prepared, and signed by two gentlemen who are not unknown to great bodies of the agriculturists of England, respectfully soliciting such opinion. Those letters were sent to every member of the Farmers' Club, agricultural societies, &c., in all the grazing counties of England from whence cattle arrive for sale in London, and in each letter was contained a stamped envelope, to ensure an early answer. That letter summed up the objections to Smithfield Cattle Market in the following terms:

"The objections to Smithfield Market, as proved before Parliament, are (according to the evidence printed last year by order of the House of Commons)—

1st. Insufficient space.*
2nd. Cattle injured by cruelty and close packing.†
3rd. Cattle not shown to advantage to buyers.‡
4th. Want of water.§
5th. Want of lairage.‖
6th. Danger to passengers in crowded thoroughfares.¶
7th. Continual increase of stock by foreign importations for home produce.**
8th. The determination of Government and Parliament to enforce sanatory measures, and abolish all nuisances, which must include Smithfield market.††"

Questions and Answers before the following "Select Committee to inquire into the Necessity for the Removal of Smithfield Market, as a nuisance in the centre of the British Metropolis, to some appropriate site, comprising an area of not less than twelve acres; and the Establishment of Abattoirs in the vicinity of London:

Viscount Mahon	Sir Edmund Filmer
Lord Robert Grosvenor	Mr. Bramston
Mr. W. B. Baring	Mr. Alderman Copeland
Mr. Sidney Herbert	Mr. Masterman
Mr. Manners Sutton	Mr. William Miles
Mr. Eliote Yorke	Mr. Stafford O'Brien.
Mr. Kemble	

* 668, 692 to 700, 1000, 1294, 2502, 2343.

† 128 to 133, 750 to 764, 995, 1006 to 1023, 1040 (loss in quality of meat, £64,000 per annum), 1245, 1607, 1820, 4046, 5784.

‡ 1044, 1883, 1901 to 1904.

§ 355, 1097 to 1107, 1263, 1837, 5840.

‖ 1867.

¶ 1217, 1561.

** 257] to 2575.

†† 398, 399, 459 to 464, 507 to 511, 546 to 549, 1078 to 1681, 2181, 2967, 3004, 3569.

The witnesses who have given the evidence referred to are Lord Robert Grosvenor, M.P.; Mr. Alderman Wilson; J. Hudson, Esq., Castle Acre; W. F. Hobbs, Esq.; W. Anderson, Esq., Agent to the Duke of Bedford; Messrs. Langham, Cramp, Sylvester, and Clarke, butchers; Doctors Guy, Aldis, Lynch; Mr. J. Betts, &c.

Now to the thousands of those circulars will it be believed that so nearly unanimous is the feeling against Smithfield, that there are only five answers expressing doubt or dissent? and that of the remainder, the vast majority of graziers promise to send their cattle to Islington, as the best proof they can give of their opinion upon the subject, so soon as the market is re-opened.

This unanimity cannot be considered surprising when it is known that already the legalised cattle market at Islington can accommodate 8,000 cattle and 50,000 sheep, besides pigs, &c.; that a railway, now in the course of construction from Blackwall to the Northern and Eastern, the Eastern Counties, and the Great Northern and Western Railways, will pass the market at a very short distance; that, consequently, cattle need not be driven into London at all; that there is abundant lairage, and plenty of water to supply their wants; that they can be shown to the best advantage; that when slaughtered the meat will be in prime condition, and, consequently, worth more money; and that the trouble and expense of bringing them to market will be considerably diminished.

To consumers of animal food the advantage will be equally great. Some who think all animals are made for the use of man would, of course, wish to have those animals in the best possible condition for food. Cattle goaded, bruised, excited into fever, deprived of water and of fodder, cannot be in that healthy condition when killed that they ought to be; hence unwholesome and putrescent meat has to be daily eaten.

Others, who think that man ought to be "merciful to his beast," will be glad of any means to lessen the agony of excessive thirst, burning fever, cruel bruises, and dreadful prostration of strength, to which many animals are subjected, before they are sold and slaughtered.

The Islington market will accomplish the objects of both.

These reasons are not adduced with the expectation that shares will be taken in consequence. Shares are rarely taken except by those who expect to make a profit from holding them, but in this company they will not be granted save to applicants who can directly or indirectly promote its objects. Nevertheless these moral and sanatory considerations will have weight with Parliament and the public generally, both of whom set their faces in 1802, 1803, 1805, 1806, 1807, 1808, 1809, 1810, and 1813, against attempts by the corporation of London to obtain Acts of Parliament to enlarge Smithfield, and thereby add to its manifold evils of obstruction, alarm, danger, disease, and death.

A careful consideration of the tolls and rates allowed to be taken by Act of Parliament at the Islington Cattle Market, and of the estimates of the original cost and current expenses, will prove the very great profit which will accrue to this company, in addition to the rents of the houses, taverns, the payments for the cooling stores, &c., &c., which will prove a great acquisition to the butchers of the metropolis. The shares are made purposely small, so that graziers, butchers, and other persons interested, however humble their means, may be enabled to participate in the advantages of the undertaking.

The following important documents will prove the opinion of the vast majority of the butchers of the metropolis as to the necessity of enlarging Smithfield in 1828, and the opinions of the great law officers of the City as to its illegality and criminality:—

"PETITION OF A DEPUTATION FROM A COMMITTEE OF BUTCHERS OF THE CITIES OF LONDON AND WESTMINSTER, AND PARTS ADJACENT, FOR AN ENLARGEMENT OF SMITHFIELD MARKET,

"*To the Right Honourable the Lord Mayor, Aldermen, and Commons of the City of London, in Common Council assembled—*

"SHEWETH,—

"That your petitioners form a deputation from the committee of Butchers, appointed at a public meeting of the trade of Butchers of the cities of London and Westminster, and the parts adjacent, held at Freemasons' Tavern on the 17th of January, 1828.

"*That your petitioners and the trade in general, as well as others, suffer very great loss and inconvenience for want of sufficient room in Smithfield market to transact their business: and that the cruelty complained of by the public chiefly arises from the same cause.*

"*That animals of every description brought there for sale are deteriorated in quality and lessened in value by various descriptions of cruel usage, to make them occupy the smallest extent of room possible in the market during their period of sale there.*

"That your petitioners consider an enlargement of Smithfield market absolutely necessary to remedy the evils complained of.

"That your petitioners are firmly of opinion that an alteration of the market day from a Friday to a Thursday would tend to equalise the market, and prevent much of the injury and cruelty complained of taking place.

"That your petitioners are confirmed in their opinion by the unanimous request and signatures of 1,527 master butchers, being housekeepers of London, Westminster, and parts (Appendix No. 17) adjacent, requesting your petitioners to obtain such alterations.

"Your petitioners therefore pray that you will take this their petition into consideration, by first allowing them to be heard at your bar in support of the allegations contained therein; and, further, by adopting such measures as will remedy the evils complained of.

"And your petitioners will ever pray.

(Signed) "WILLIAM GIBLETT.
"W. SYLVESTER.
"WILLIAM MANN.
"CHRISTOPHER SCALES.
"MICHAEL SCALES."
&c. &c.

OPINION OF THE RECORDER, COMMON SERGEANT, &C., AS TO THE ILLEGALITY OF ENLARGING SMITHFIELD.

"We are of opinion that the corporation have no legal authority to make use of their lately-purchased freehold estate in Long-lane by way of extension or enlargement of the present Smithfield Market. *No toll can be legally demanded or taken on such extended market place, nor will a sale there operate as a sale in market overt.* The market is granted to the City to be held in Smithfield, and the law is most clearly laid down in the case of Weyhill Market, reported in 3 Mad. Rep., 108, and in a very modern decision of Curwen *v.* Salkeld, that where the place in which the market is to be held is limited, the market cannot be held out of that boundary. *In case such an enlargement of the charter market should be made by the City, it would be an usurpation on the Crown, for which they would be answerable in an information of quo warranto, in which judgment of amoval of such usurped franchise would be given against them, and they would be fined at the discretion of the Court for such usurpation.*

"We cannot recommend the use of the estate for the reception of cattle as a mere resting-place, independent of the question which would very likely arise, whether such use might not be a nuisance to the surrounding neighbourhood, and how far the alteration might be productive of peculiar injury to individuals, which would be the subject of a private action to each person whose interest would be affected by it. We conceive that such resting-place would lead to all the evils complained of at Islington and the other places near London. Sales there would be *illegal, and the sellers would be guilty of forestalling, at common law; and if the practice of buying and selling on that spot got to an inconvenient extent, both buyers and sellers might be involved in the guilt of conspiracy to injure the legal market.*"

RETURNS PRESENTED BY MR. ALDERMAN WILSON.

SMITHFIELD MARKET.—A return of cases of cruelty brought under the notice of the police from June, 1846, to June, 1847:—

Convicted	78
Absconded	2
Dismissed	8
Forgiven	1
	89

In reply to a question as to summoning parties for cruelty to the cattle, the constable of the Society for the Prevention of Cruelty to Animals deposes—

"We do not always summon people; we very frequently see a great deal of cruelty in Smithfield market that cannot be possibly avoided; the drovers themselves often complain and excuse themselves; they say it is quite impossible, from the smallness and confined state of the market, with so many animals in the market, that they can avoid striking them and beating them at times.

"CHAIRMAN.—And you, seeing the necessity of this cruelty to a certain extent, do not interfere, because you think it is necessary?—Certainly; I have frequently reported it to our secretary, and I have explained to him how it is, and he has declined summoning the parties on that account."

"ALDERMAN WILSON.—I have heard the police say that it is very difficult to catch a thief in Smithfield, because he jumps into the pens, and they cannot catch him; and they also say that it is a receptacle at night for thieves and prostitutes, and bad characters of all kinds. When I tell you that during the last year there have been 300 persons taken into custody in Smithfield for different offences, you must infer that it is a very great nuisance to the City. Here is an official return:—

Return of the number of persons taken into custody for offences committed in Smithfield market on market days during the year 1846:—

Assaults	13
Assaults on, or obstructing police	20
Breach of the market regulations	86
Disorderly	43
Disorderly and drunk	29
Drunk only	37
Disputed claims	6
Felony, and suspicion of felony	13
Obstructions	16
Picking pockets	32
Suspicious characters	6
Unlawful possession	4
	305"

STALLIONS FOR THE SEASON.

Name.	Colour.	Age.	Pedigree.	Performances.	Principal Performance.	Number winners out by.	Sire of	Standing at	Apply to	Price.
Advocate	bay	16	by Partisan, out of Duckling, by Phantom	started 7, won 3	won Bibury cup	—	—	Corsham, Wilts	Mr. Gardner	6 gs., h. b. 3 gs.
Alarm	bay	6	by Venison, out of Southdown, by Defence	started 17, won 13	won Ascot cup	untried.	—	Hampton Court	—	15 gs.
Aliwal	bay	4	by Jereed, out of Katherine, by Camel	started 9, won 1	won trial s. at Warwick	untried.	—	Southam, Leamington	Mr. J. Clarke	2 gs.(winners *gratis*)
Amorino	bay	8	by Velocipede, out of Jane Shore, by Woful	started 3, won 1	won Ascot Derby	untried.	—	Moulton Paddocks, Newmarket	—	7 gs., h. b. £2 5s.
Annandale	brown	6	by Touchstone, out of Rebecca, by Lottery	started 15, won 3	ran second for Derby	untried.	—	Lane Paddocks, Sheffield	F. Croft	7 gs., h. b. 3 gs.
Archy	bay	9	by Camel, out of Garcia, by Octavian	started 8, won 3	won £1000 at Newmarket	untried.	—	Stockbridge	Mr. Isaac Sadler.	5 gs., h. b. 3 gs.
Auckland	brown	9	by Touchstone, out of Maid of Honour, by Champion	started 9, won 5	won £700 at Ascot	1	Sir Oliver	Stoke's Farm, Wokingham	—	10 gs.
Ballinkeele	bay	9	by Irish Birdcatcher, out of Perdita, by Langar	started 6, won 3	won the Angleseas	untried.	—	The Lodge, Wentworth	—	10 sovs., h. b. 2 sovs.
Barnacles	chesnut	15	by Cain, dam by Bourbon	started 25, won 11	won Goodwood S.	untried.	—	Veterinary Establishment, Bath	Mr. Harvey	thoroughbred *gratis*, h. b., 3 gs.
Barnton	bay	4	by Voltaire, out of Martha Lynn, by Mulatto	started 3	—	untried.	—	Leyburn, York	Mr. J. Ridley	5 gs., h. b. 2 gs. (winners *gratis*)
The Baron	chesnut	6	by Birdcatcher (Irish), out of Echidna, by Economist	started 12, won 5	won St. Leger	untried.	—	Stockwell, Surrey	J. Lowry	12 gs.
A Bay Horse	—	11	by Mulatto or Starch, out of Young Petuaria, by Rainbow	started 4, won 1	won £100 at Hampton	untried.	—	Stockwell, Surrey	J. Lowry	2 gs.
Bay Middleton	bay	15	by Sultan, out of Cobweb, by Phantom	started 7, won 7	won the Derby	67	Planet	Turf Tavern, Doncaster	W. Cunningham.	10 gs.
Bay President	bay	16	by President, out of Lady Elizabeth, by Akarius	never appeared	—	—	—	Waitwith, &., York	Mr. J. Foxton	5 gs., h. b. 2 gs.
Beiram	chesnut	19	by Sultan, out of Miss Cantley, by Stamford	started 17, won 8	won Drawing Room S.	12	Hydrangea	Burghley, Stamford	Lord Exeter	10 sovs.
Belzoni	brown	25	by Blacklock, out of Manuella, by Dick Andrews	started 29, won 11	won Ascot Oatlands	12	Mungo Park	Lutterworth, Leicester.	Mr. Lucas	10 gs, h. b 3 gs.
Birdcatcher (Ish.)	chesnut	15	by Sir Hercules, out of Guiccioli, by Bob Booty	started 15, won 6	won the Madrids	39	The Baron	Easby, Richmond, York	R.M.Jaques, Esq.	10 gs.
Birkenhead	brown	5	by Liverpool, out of Arachne, by Filho da Puta	never appeared	—	untried.	—	Camp Lodge, Lisburn, Ireland.	—	4 gs.,h.b. 2gs.(dams of winners *gratis*)
A British Yeoman	bay	8	by Liverpool, out of Fancy, by Osmond	started 8, won 4	won the Champagne	untried.	—	Newtown, Carlisle	R. Moffatt	5 gs., h. b. 2 gs.
Broadholm	bay	8	by Jereed, out of Wagtail, by Whisker	started 12, won 1	won £50 at Dumfries	untried	—	Paddocks, Sheffield	F. Croft	—
Cæsar	bay	12	by Sultan, out of Cobweb, by Phantom	started 6, won 3	won Riddlesworth	7	Icicle	Paddocks, Newmarket	W. Taylor	10 gs., h. b. 5 gs.
Calmuck	bay	15	by Zinganee, dam by Rubens	started 27, won 12	won Gorhambury S	untried.	—	Stockwell, Surrey	J. Lowry	10 gs, h. b. 4 gs.
Camel	bay	9	by Camel, out of Velocity, by Blacklock	never appeared	—	untried.	—	The Lodge, Wentworth.	—	5 sovs., h. b. 2 sovs.
Camelino	bay	12	by Camel, out of Maria, by Waterloo	started 31, won 10	won Prendergast	untried.	—	The Hippodrome	H. Paterson & Co.	7 gs.
Cardinal Puff	brown	14	by Pantaloon, out of Puff, by Waterloo	started 33, won 17	won the Chester Cup	1	The Cardinal's Niece	Ferry-bridge, Pontefract	Mr. Smallpage	5 gs., h. b. 2 gs.
Catesby	bay	8	by Slane, out of Cobweb, by Phantom	started 1	—	untried.	—	Hippodrome, Bayswater	Messrs. Paterson and Co.	—
Charles XII.	brown	12	by Voltaire, out of Wagtail, by Prime Minister	started 34, won 19	won St. Leger	3	Miss Harrison	Willesden Paddocks	Messrs Tattersall	15 gs.
Charley Boy	chesnut	13	by Actæon, dam by Ardrossan	started 7, won 1	won £200 at York	—	—	Bleatarn, Carlisle	Mr. W. Ellwood	5 gs., h. b. 2 gs.
Chatham	chesnut	9	by The Colonel, out of Hester, by Camel	started 16, won 8½	won the Criterion	untried.	—	Ham, Arundel	—	12 gs.
Colwick	brown	20	by Filho da Puta, out of Stella, by Sir Oliver	started 28, won 9	won the Chester Cup	14	Attilla	The Lodge, Wentworth.	—	5 sovs., h. b. 2 sovs.
Combat (h.b.)	bay	15	by Defence, dam (h.-b.) by Anticipation	started 36, won 16	won Billesden Coplow (2)	1	Tom Jolly	Dowington, Lechlade	Mr. Price	5 gs., h. b. 2 gs.
Cotherstone	bay	8	by Touchstone, out of Emma, by Whisker	started 11, won 7½	won the Derby	untried.	—	Althorpe, Northampton	Mr. J. Elliott	15 sovs. (40 subs.)
Counsellor (h.-b.)	chesnut	9	by Mundig, out of Catchfly (h.-b.)	started 38, won 23	won Audley End S.	untried.	—	Newport Pagnell	Mr. Westley	£2 12s. 6d.
Cowl	bay	6	by Bay Middleton, out of Crucifix, by Priam	started 8, won 5	won the Buckenham	untried.	—	Althorpe, Northampton	Mr. J. Elliott	10 sovs.
The Cure	bay	7	by Physician, out of Morsel, by Mulatto	started 26, won 15	won the Claret	untried.	—	Willesden Paddocks	Messrs. Tattersall	10 gs., h. b. 5 gs.
The Doctor	black	14	by Dr. Syntax, dam by Lottery	started 44, won 29	won the Hooton S.	7	Doctrine	Barnton, Edinburgh	D. Douglas	7 gs., h. b. 4 gs.
Don John	bay	13	by Tramp or Waverley, dam by Comus	started 10, won 9	won St. Leger	18	Iago	Bretby, Burton-on-Trent	Mr. Taylor	20 sovs. (30 subs.)
Drayton	brown	11	by Muley, out of Prima Donna, by Soothsayer	never appeared	—	1	C. ont of Foxhill's dam	Bonehill, Fazeley	E. Ward	10 gs., h. b. 4 gs.
Dreadnought	bay	11	by Defence, dam by Selim	started 10, won 1	won £450 at Newmarket	untried.	—	Northampton	Mr. S. Dickens	5 gs., h. b. 3 gs.
Dulcimer	chesnut	12	by Muley, out of Dulcamara, by Waxy	started 1	—	2	Dulcet	Stockbridge, Hants	Mr. Y. King	10 sovs., h. b. 5 sovs.
Earl of Richmond	brown	8	by Touchstone, out of Queen of Trumps, by Velocipede	started 1, won 1	won Lyme Park, Newton	1	Earl of Richmond	Paddocks, Newmarket	W. Taylor	10 gs., h. b. 5 gs.
The Emperor	chesnut	7	by Defence, dam by Reveller	started 4, won 2	won the Ascot Cup (2)	untried.	—	Quidenham Hall, Norf.	S. Coulson	12 gs.
Epirus	chesnut	14	by Langar, out of Olympia, by Sir Oliver	started 31, won 12	won Copeland Handicap	7	Pyrrhus the First	Pitsford, Northampton.	Mr.T.B.Potterton	15 gs.

Evenus	bay	8	by Alpheus, out of Marpessa, by Muley	started 31, won 15½	won Cambridgeshire S..	untried.	—	Hippodrome, Bayswater	H. Paterson & Co.	10 gs., h. b. 5 gs.
Fancy Boy	brown	5	by Tomboy, dam by Muley	started 12, won 7	won Dee Stakes	untried.	—	Rawcliffe, York	Isaac Watson	7 gs., h. b. 3 gs.
Faugh-a-Ballagh	brown	7	by Sir Hercules, out of Guiccioli, by Bob Booty	started 9, won 5	won St. Leger	untried.	—	Dean's Hill, Stafford	Mr. J. Painter	12 gs.
Freeman	bay	6	by Sheet Anchor, out of Mortgage, by Bedlamite	started 1, won 1	won £190 at Chester	untried.	—	Colliergate, York	Mr. S. Reed	5 sovs., h. b. 2 sovs.
Foxberry	bay	9	by Voltaire, out of Matilda, by Comus	started 34, won 9	won Glasgow Cup	untried.	—	Cheltenham	Messrs. Humphreys	5 sovs., h. b. 3 sovs. (dams of winners, *gratis*).
Galanthus	bay	9	by Langar, out of Cast-steel, by Whisker	started 8, won 3	won Great Yorksh. Stakes	untried.	—	Belsay, Newc.-on-Tyne	Mr. J. Aynsley	8 sovs.
Galaor	bay	10	by Muley Moloch, out of Darioletta, by Amadis	started 13, won 5	won Manchester Cup	untried.	—	Harker Lodge, Carlisle	Mr. Blamire	7 gs.
Gameboy	black	6	by Tomboy, out of Lady Moore Carew, by Tramp	never appeared	—	untried.	—	Holcombe, Bury, Lanc.	—	5 gs. (dams of winners of £50, *gratis*).
Garry Owen	chesnut	11	by St. Patrick, out of Excitement, by Emilius	started 73, won 33	won Stewards' C., Good.	untried.	—	Newmarket	Mr. Pettit	10 gs., h. b. 5 gs.
Gibraltar	bay	11	by Muley, out of Young Sweet Pea, by Godolphin	started 9, won 5, and divided 2	won the Port	untried.	—	Hampton Court	—	10 sovs., h. b. 5 sovs.
Gilbert Gurney	chesnut	13	by Muley, out of Miss Orville, by Pendulum	started 19, won 4	won Wolverhampton S.	2	The Traverser	Mount Pleasant, O. Warden, Beds.	Thomas Morgan	12 gs.
Giraffe	bay	4	by Carew, out of Madcap, by Dinmont	never appeared	—	untried.	—	Corsham, Wilts	Mr. Gardner	thoroughbred *gratis*. h. b., 2 gs.
Giovanni	brown	20	by Filho da Puta, dam by Don Juan	started 59, won 23	won Manchester Cup	4	Lothario	Hippodrome, Bayswater	H. Paterson & Co.	10 gs., h. b. 5 gs.
Gorhambury	bay	8	by Buzzard, out of Brocard, by Whalebone	started 11, won 3	ran second for Derby	untried.	—	Villa Stables, Mordon Lane	Mr. Lewis	7 sovs., h. b. £3 10s.
Harlequin	brown	5	by Pantaloon, out of Lapwing, by Morisco	started 1	—	untried.	—	The Lodge, Wentworth.	—	5 sovs., h. b. 2 sov
Harkaway	chesnut	14	by Economist, dam by Naboeklish	started 38, won 25	won Goodwood Cup (2).	19	Horn of Chase	Rossmore Lodge, Kildare	—	6 gs., h. b. 3 gs.
Heron	brown	15	by Bustard, dam by Orville	started 41, won 17	won Liverpool Cup	6	Charlotte	Erdington, Birmingham	J. Sheppard	10 gs.
Hetman Platoff	brown	12	by Brutandorf, dam by Comus	started 10, won 6	won Northumberland P.	24	Cossack	Tickhill Castle, Rotherham	W. Hornshaw	15 gs.
Hornsea	chesnut	16	by Velocipede, dam by Comus	started 20, won 10	won Goodwood Cup	15	Lady Wildair	Bretby, Burton on Trent	Mr. Taylor	10 sovs.
Humphrey	bay	13	by Sandbeck, out of Oceana, by Cerberus	started 46, won 16	won Stockton Plate	untried.	—	Sowdon Scarbro'	Mr. R. Coverley	5 gs., h. b. 2 gs.
The Hydra	chesnut	13	by Sir Hercules, out of Zebra, by Partizan	started 19, won 5	won Croxton Park Cup	1	—	Tollerton, York	Mr. R. Batty	5 gs., h. b. 2 gs.
John of Gaunt	chesnut	10	by Taurus, out of Mona, by Partizan	started 38, won 23	won Newmarket S.	untried.	—	Paddocks, Newmarket	Messrs. Barrow	10 gs.
Ion	brown	13	by Cain, out of Margaret, by Edmond	started 6, won 1	ran second for the Derby	3	Ionian	Newmarket	Mr. Barrow	15 sovs.
Ithuriel	bay	7	by Touchstone, out of Verbena, by Velocipede	started 3, won 2	won Liverpool St. Leger	untried.	—	Middlethorpe, York	Mr. Smallwood	10 sovs., h. b. 5 sovs.
Knight Templer	chesnut	4	by Jack in the Green, out of Babel, by Interpreter	never appeared	—	untried.	—	Temple-newsam Leeds	Mr. J. Mills	5 gs., h. b. £2 5s., winners *gratis*.
Kt. of the Whistle	chesnut	10	by Velocipede, dam by Whisker	started 42, won 12	won R. Hunt Cup	untried.	—	Brixworth, Northamp.	Mr. W. Derry	5 gs., h. b. 3 sovs.
Kremlin	brown	12	by Sultan, out of Francesca, by Partizan	started 13, won 6	won Cleveland Cup	6	Jumble	Dalkeith Park, Scotland	Mr. Marshall	10 sovs., h. b. 3 sovs.
Lancrost	brown	14	by Liverpool, out of Otis, by Buzzard	started 40, won 26	won Ascot Cup	29	Van Tromp	York	Mr. Kirby	25 gs.
Launcelot	brown	11	by Camel, out of Emma, by Whisker	started 10, won 6½	won St. Leger	3	Blaze	Billington, Delamere Forest	Mr. Winsor	12 gs. (40 subs.)
Laurel	brown	24	by Blacklock, dam by Prime Minister	started 27, won 12	won 8 Gold Cups	13	Westeria	Stockwell, Surrey	J. Lowry	12 gs., h. b. 6 gs.
The Libel	brown	6	by Pantaloon, out of Pasquinade, by Camel	started 7, won 3	won Chester St. Leger	untried.	—	Bushbury, Wolverh.	Mr. Phillips	7 gs., h. b. 4 gs.
Lord Stratford	bay	14	by Langar, dam by Waxy	started 3, won 1	won £125 at Chester	3	Fitz-William	Nottingham	Arthur Chester	10 sovs., h. b. 2 sovs.
The Magnet	brown	17	by Muley, out of Bequest, by Election	started 7, won 2	won £100 at York	—	—	Wroughton Swindon	Mr. H. Reeves	5 gs., h. b. 2 gs.
Melbourne	brown	14	by Humphrey Clinker, dam by Cervantes	started 18, won 9	won Palatine Stakes	5	Sir Tatton Sykes.	Turf Tavern, Dringhouses, York	Mr. G. Forster	15 gs.
The Merry Monarch	bay	6	by Slane, out of The Margravine	started 4, won 1	won the Derby	untried.	—	Ham, Arundel	—	*gratis*.
Meteor	chesnut	9	by Velocipede, out of Dido, by Whisker	started 2, won 1	won the 2000 gs. Stakes	untried.	—	The Lodge, Wentworth	—	5 sovs., h. b. 2 sovs.
Mr. Martin	brown	4	by Lanercost, out of Miss Martin, by Voltaire	started 2, won 1	won Windsor Stakes	untried.	—	Thirsk	Mr. G. Holmes	7 gs., h. b. 2 gs.
Muley Moloch	brown	18	by Muley, out of Nancy, by Dick Andrews	started 17, won 11	won the Port	75	Alice Hawthorn	Stockwell, Surrey	J. Lowry	20 gs.
The Nob	bay	10	by Glaucus, out of Octave, by Emilius	started 17, won 6½	won £600 at Ascot	2	Alboni	Downside, Cobham, Sur.	M. Todd	25 gs.
Nutwith	bay	8	by Tomboy, dam by Comus	started 7, won 3	won St. Leger	untried.	—	Morton-on-Swale, Northallerton	Mr. Robinson	10 gs.
Oakley	bay	10	by Taurus, out of Oak Apple, by Royal Oak	started 49, won 31	won the Column	untried.	—	Willesden Paddocks	Messrs. Tattersall	10 gs., h. b. 5 gs.
The Odd Mixture	black	7	by Ion, out of Mary Ann, by Blacklock	started 9, won 2	won £70 at Newmarket	untried.	—	Cherrydown, Chingford	—	8 gs.
Old England	bay	6	by Mulatto, out of Fortress, by Defence	started 12, won 8	won New S. Ascot	untried.	—	Leybourne, Maidstone.	Mr. Tweed	15 gs.
Orlando	bay	7	by Touchstone, out of Vulture, by Langar	started 11, won 10	won the Derby	untried.	—	Bonehill, Fazeley	E. Ward	12 gs., h. b. 5 gs.
Palmurus	bay	9	by Sheet Anchor, out of Katherine, by Soothsayer	started 1	—	untried.	—	Ardee, Louth, Ireland	C. Campbell	2 sovs.
Pantaloon	chesnut	24	by Castrel, out of Idalia, by Peruvian	started 7, won 6	won Warwick St. Leger	33	Satirist	Cawston, Rugby	—	12 gs.

Continued on next page.

STALLIONS FOR THE SEASON—*(Continued).*

Name.	Colour.	Age.	Pedigree.	Performances.	Principal Performance.	No. of winners out by.	Sire of	Standing at	Apply to	Price.
Paragone	bay	5	by Touchstone, out of Hoyden, by Tomboy	started 12, won 8	won Coffee Room Stakes	untried.	——	Newmarket	T. Starling	5 gs., h. b. 2½ gs.
Perkin Warbeck	chesnut	7	by Beiram, out of Romaike, by Rowton	started 1	——	untried.	——	Belgrave Gate, Leicester	Mr. E. Bailey	5 gs., h. b. 3 sovs.
Peter the Hermit	chesnut	8	by Gladiator, dam by Velocipede	started 10, won 3½	won 100 gs. at Lewes	untried.	——	Villa Stables, Mordon-l.	Mr. Lewis	5 sovs., h. b. £2 10s.
Phlegon	bay	8	by Beiram or Sultan, out of Lucetta, by Reveller	started 6, won 2	won Grand D. Michael S.	untried.	——	Burghley, Stamford	Lord Exeter	10 sovs.
Picaroon	black	13	by Voltaire, out of Handmaiden, by Walton	started 3, won 2	won the Mersey	10	Pantasa	Selby, Yorkshire	Mr. J. Yorke	7 sovs., h. b. 3 sovs.
Plenipotentiary	chesnut	17	by Emilius, out of Harriet, by Pericles	started 8, won 7	won the Derby	40	The Era	Horseheath, Linton, Cambridgeshire	Mr. Martin	15 gs., h. b. 5 gs.
Politician	roan bay	16	by President, dam by Soothsayer	never appeared	——	——	——	Malton, &c., York	Mr. J. Foxton	5 gs., h. b. 2 gs.
Prizefighter	chesnut	8	by Gladiator, out of Barbara, by The Laird	started 5, won 2	won Great Yorksh. S.	untried.	——	Bockley Hall, Leicester	——	2 sovs.
Ratan	chesnut	7	by Buzzard, dam by Picton	started 7, won 3	won the Criterion	untried.	——	Park Farm, Clay Hill, Enfield	Mr. A. Gray	7 gs., h. b. 2 gs.
Ratcatcher	chesnut	18	by Langar, out of Rufina, by Blacklock	started 65, won 25	won the Cleveland Cup	7	Rat Trap	Willesden Paddocks	Messrs. Tattersall	8 gs., h. b. 5½ gs.
Red Deer	bay	7	by Venison, out of Soldier's Daughter, by The Colonel	started 20, won 10	won the Chester Cup	untried.	——	Catterick	Mr. C. Pybus	10 gs.
Riddlesworth, brother to	chesnut	15	by Emilius, out of Filagree, by Soothsayer	never appeared	——	——	——	Bell Hotel, Leicester.	R. Noon	7 gs., h. b. £2 10s.
Robert de Gorham	brown	9	by Sir Hercules, out of Duvernay, by Emilius	started 20, won 7	ran second for the Derby	untried.	——	Ham, Arundel	——	12 gs.
Robinson	brown	13	by Robin, out of Miss Muley, by Muley	started 15, won 6	won £140 at Newcastle	untried.	——	Sunderlandwick, Driffield	Mr. A. Irvine	5 gs., h. b. 2 gs.
St. Francis	bay	13	by St. Patrick, out of Surprise, by Scud	started 49, won 28	won the Ascot Cup	5	Pet of the Fancy	Newmarket	Mr. Pettit	10 gs.
St. Lawrence	brown	11	by Skylark or Lapwing, out of Helen, by Blacklock.	started 58, won 23	won the Chester Cup	untried.	——	Lowfold, Wesboro.' Sussex.	The Bailiff	15 sovs.
St. Martin	brown	13	by Actæon, out of Galena, by Walton	started 19, won 9	won the Dumfries Cup	12	Eryx	Burghley, Stamford	Lord Exeter	15 sovs.
Scroggins	bay	15	by Tramp, out of Arcot Lass, by Ardrossan	started 23, won 9	ran second for St. Leger	2	Fisticuff	Beverley, &c.	——	5 gs., h. b. 2 gs.
Scutari	bay	11	by Sultan, out of Velvet, by Oiseau	started 22, won 9	won Newmarket Stakes	untried.	——	Burghley, Stamford	Lord Exeter	10 sovs.
The Sea	bay	18	by Whalebone, dam by Orville	started 5, won 2	won £155 at Croxton Pk.	2	Mermaid	Howbridge, Malton	Mr. W. Blamire	7 gs., h. b. 3 gs.
Seaman	brown	6	by Camel, out of Seabreeze, by Paulowitz	started 1	——	untried.	——	Bishopstone, Wilts	Mr. H. Taylor	10 sovs., h. b. 3 sovs.
Sensation	brown	6	by Slane, out of Adela, by Emilius	started 8, won 1	won £50 at Bibury	untried.	——	Cherry-down, Chingford	——	3 gs.
Sir Hercules	black	22	by Whalebone, out of Peri, by Wanderer	started 9, won 7	won the Claret	52	Faugh-a-Ballagh	Wilton House, Salisbury	Stud Groom	25 sovs. (40 subs.)
Sir Isaac	brown	17	by Camel, out of Arachne, by Filho da Puta	started 7, won 3	won a Produce at Liverp.	4	Yardley	Yardley, Birmingham	Mr. Holloway	10 gs., h. b. 3 gs.
Slane	bay	15	by Royal Oak, dam by Orville	started 18, won 9	won Waterloo Shield	48	The Princess	Hampton Court	——	25 sovs.
Spanish Jack	brown	5	by Don John, out of Miss Lydia, by Walton	started 3, won 1	won £70 at Newton	untried.	——	Downington, Lechlade	W. Price	5 gs., h. b. 2 gs.
The Squire	grey	10	by The Saddler, dam by Minos	started 17, won 9	won Newcastle St. Leger	untried.	——	Hutton Sessay, Thirsk	Mr. S. Pinkney	5 gs., h.b. £2 12s. 6d.
Sweetmeat	brown	6	by Gladiator, out of Lollypop, by Starch	started 24, won 22½	won Queen's Vase	untried.	——	Stanton, Shiffnal	Mr. J. Eyke	7 gs., h. b. 4 gs.
Swinton	bay	11	by Mulatto, out of Ringlet, by Whisker	never appeared	——	untried.	——	The Lodge, Wentworth	——	5 sovs., h. b. 2 sovs.
Theon	brown	11	by Emilius, out of Maria, by Whisker	started 6, won 3	won Doncaster 2 yrs. S.	4	Sagacity	Newmarket	T. Starling	10 gs., h. b. 3 gs.
Thistle Whipper	bay	10	by Beagle, out of Miss Maltby, by Filho da Puta	started 11, won 8	won £325 at Newmarket.	untried.	——	Stockbridge	Mr. Isaac Sadler	8 gs, h. b. 4 gs.
True Boy	brown	8	by Tomboy, dam by Muley	started 45, won 11	won Manchester Cup	untried.	——	Ripon	Mr. R. Blacker	5 gs., h. b., 2 gs.
Tupsley	bay	11	by Dr. Faustus, out of Sylph, by Spectre	started 20, won 6	won Hereford Stakes	untried.	——	Cheltenham	Msrs. Humphreys	5 gs., h. b. 2 gs.
The Ugly Buck	bay	7	by Venison, out of Monstrosity, by Plenipotentiary.	started 5, won 3	won 2,000 gs. Stakes	untried.	——	Ravenhill, Belfast, Ireland	——	7 gs. (45 subs.)
Velocipede	chesnut	23	by Blacklock, dam by Juniper	started 10, won 7	won Liverpool Cup	125	Queen of Trumps	Shadwell, Leeds	J. Berridge	10 gs., h. b. 5 gs.
Venison	brown	15	by Partizan, out of Fawn, by Smolensko	started 22, won 16½	won Portland Handicap	43	Alarm	Broughton Stockbridge	Mr. Dixon	25 gs.
Verulam	bay	15	by Lottery, out of Wire, by Waxy	started 1	——	5	Vulcan	Lane Paddocks, Sheffield	F. Croft	10 gs., h. b. 5 gs.
Vol-au-vent	bay	7	by Voltaire, out of Pauline, by Moses	started 13, won 3	won Newmarket Handic.	untried.	——	Lowfold, Westboro' Sussex	The Bailiff	(*gratis.*)
Weatherbit	brown	6	by Sheet Anchor, out of Miss Letty, by Priam	started 8, won 3	won 4 yrs. old Stakes	untried.	——	Newmarket	——	5 gs.
Wintonian	brown	14	by Comet, out of Monimia, by Muley	started 4, won 3	won the Lavant	4	Winchester	Sudbury, Suffolk	Mr. W. Brown	5 gs., h. b. 2 gs.
Young Hercules	bay	5	by Sir Hercules, out of Hibernia, by Velocipede	never appeared	——	untried.	——	Park Farm, Clay Hill, Enfield	Mr. A. Gray	7 gs., h. b. 2 gs.
Young Lochinvar	chesnut	8	by Tipple Cider, out of Aquilonia	started 27, won 7½	won £100 at Newmarket	untried.	——	Coates House, Petworth	——	5 gs. dams of winners *gratis*).
Young Priam	bay	12	by Priam, out of Sea-mew, by Scud	started 3	——	2	Tom Tough	Manor House, Catterick	——	5 gs., h. b. 2 gs.

(The Groom's Fee, if not included, varies from 2s. 6d. to £1 1s.) Clarion and Ismael died about the commencement of this season; while as Touchstone is not advertised, we may conclude his subscription to be full.

ON PARING AND BURNING.

Paring is the cutting of the surface of the earth into thin turfs or pieces; Burning is a reducing or changing the state of substances by the action of fire; and the two words form the process of cultivation called "Paring and Burning." The fact that all vegetable and many other substances, that undergo the action of fire, are converted into elements that are highly conducive to the growth of plants, seems to have been known at a very early period of history, for all the ancient writers mention the practice of applying fire to the land in some way for the purpose of increasing the produce of the earth. The practice seems to have been early introduced into this country, for our oldest writers relate that it was used under the name of "Denshiring," or "Devonshiring" or "Denbighshiring," the names of the counties where it was first introduced, and they all agree in stating the good effects which followed that mode of preparing lands for the production of crops. The method consists in paring with a spade or plough the surface of any lands that are covered with a coarse and overgrown foggage or brushwood, into pieces not exceeding two inches in thickness, in the early spring months, and afterwards drying and reducing them to ashes by burning. These being spread over the surface, the land is ploughed lightly and well harrowed, and most generally sown with turnips, cole or rape, as the preparation or beginning of the subsequent course of tillage. The operation is most conveniently performed by men, with spades made for the purpose, which are formed with a thin blade of about one foot in length, and terminating in a sharp point; and the left side of the blade is provided with an upright coulter, which cuts the slices in a straight line, and are then turned off to the right-hand side by a twitch which the man gives to the implement. The handle or shaft is about seven feet in length, with a curved bend rising to the upper end, on which is placed a cross hilt about two feet in length, by which the workman holds the implement, and guides the process of cutting. The implement is so constructed that the spade lies nearly flat on the ground when the hilt rests against the thighs of the workman, which are guarded by boards or by pads of wool, fastened on straps, while he propels the implement through the tough surface.

In some cases an oval shape has been adopted in loose soils, and the upright coulter has been laid aside on stony lands, on account of the additional incumbrance. Ploughs of various kinds have been employed for the purpose of paring the surface of rough lands. The Dutch plough was the first used, with a cutting spade fixed below the beam, and supported backwards by two strong-kneed crutches, and moveable where they join the beam, in order to regulate the set of the cutting blade. The beam is supported forwards by a wheel, which is sometimes sharpened into an edge to cut the surface in place of the upright coulter. The Berkshire skim has a wheel for supporting the beam, and a cutting knife placed below the joining of the stilts, formed in the shape of a square fourteen inches in length, the under side of which is sharpened and cuts the surface, while the two upright sides are fastened to the plough, so that both they and the wheel in front can be set at pleasure to regulate the depth of cutting.

These implements have answered a very good purpose in certain cases; in others they have been found ineffectual. The common plough has been used with the working share, and sometimes with a broader-share, when the mould-board was taken off: the land was generally too deep cut, and a great difficulty was experienced in regulating the depth to any degree of correctness. On lands that have a moderate covering of coarse plants, and where the surface is pretty level, these implements have accomplished the purpose very well; but on very rough and uneven grounds, and where much growth presents a constant obstruction, they will be found much inferior to the common turn-wrist plough, provided with a sharp share fastened on the circular chep, and with an upright coulter, or with one fastened in the beam, to cut the left hand side of the furrow-slice. The length, strength, and weight of this implement impart a steadiness that no other plough possesses for effecting such work; and the principle of construction, in part of the moving power pulling downwards from the beam, by means of the bended chain of draught, give it advantages on such soils and for such purposes over every other yet brought into competition with it. In all common cases, however, the operation will be best performed by hand work: it affords a better opportunity of paring the surface so that no parts escape, and also of working to any required depth. But paring by the plough is cheaper, and has been used very effectually. Where deep paring is required, it is more applicable; though a great quantity of surface raised for burning has created much labour and disappointment in wet seasons.

The expense of paring and burning, like other

operations of a similar nature, will vary according to the price of labour in the locality, and the quality and condition of the surface that is intended to undergo the operation. The cost, when performed by hand labour, may be stated at the average of 20s. an acre for paring alone, and the burning and spreading of the ashes at the same sum; the whole expense varying from 40s. to 50s. per acre. The two processes of paring and burning are sometimes joined in a contract, and often performed separately; and the spreading of the heaps is similarly managed.

Land may be pared in autumn, but the most common time is in the spring so soon as dry weather occurs; when the turfs are set up on edge to be dried, after the upper surface has been exposed for that purpose from the time of cutting. If the weather prove favourable, the slices will soon be ready for heaping; which is performed by placing roots, furze, heath, or any combustibles, or in the absence of all these, by placing the roughest sods on the land in an open manner, and piling the slices over them until a heap of moderate size is formed, when the fire is applied below, and the whole ignited. A smothering fire being much recommended, larger heaps have been made, and the outsides kept close and secured against the flames bursting out; in other cases, small heaps, a few yards distant from each other, are formed in a conical shape, with the sods set on edge in the inside, and laid close on the outside, and then ignited and consumed with a close, smothering fire.

Much trouble is very often experienced in any process of burning, and some attention and discretion are required in directing the operations. If large heaps be formed, the weight may crush and extinguish the fire; or it may become too violent, dissipate the vegetable matters, and reduce the earthy matters to slags or scoriæ; and if the heaps be small, and the sods damp, the combustion will be difficult; and the flame being unconfined, will burst outwards and be soon extinguished. The insides of the heap will be reduced before the outsides; and it is customary in some places to open the heaps when half-burned, and to spread the ashes from the inside over the land, and proceed with the outsides and unburnt turfs till the whole are similarly treated. In dry seasons, and where the pared surface is light and fibrous, or covered with furze or heaths, the sods have been burned where they lay, without being heaped; and excellent crops have been got by sowing the seeds of plants on the ashy surface without ploughing the land, and good pastures have been formed by sowing clovers and perennial seeds on the pulverized materials, where no useful grass or plant had ever before appeared. But this method must suppose a surface of a particular sort, loose and friable, and the foggage of a fibrous and spongy nature.

After the burning has been completed, it is recommended to spread the ashes, and allow a time for cooling them before the land is ploughed, which is usually done with a thin furrow, and rendered fine by harrowing before the turnip or cole seeds are sown, most commonly in the month of July. Equal benefits have been derived from sowing the seeds among the cooled ashes without any ploughing, which saves much labour; for on stiff soils it is often very difficult at that dry season to obtain a tolerable tilth for the reception of the seed. It is recommended to allow the ashes a time to cool before sowing any seeds, and during that time to apply a quantity of lime among the ashes; which in some cases has proved very beneficial, while in others it has produced no visible effects. It is generally reckoned an object to keep the ashes near the top, for the purpose of affording immediate nourishment to the plants; and with this view the ashes have been spread on the ploughed surface from the unploughed parts, and which were next similarly treated on being ploughed with the ashes from the adjoining spaces.

The profits and advantages that have been derived from the practice of paring and burning the rough surface of unimproved lands have been so well attested and so fully acknowledged, that it would be altogether superfluous to quote authorities in its favour. That it is the quickest and most profitable mode of converting certain lands into a state of tillage has not been denied by the most virulent opponents of the practice.

This position being granted, the next consideration is the objection generally urged against it, that on fen lands, where the upper surface is spongy from the accumulation of vegetable fibres, the burning, or repeated burning of it, diminishes the staple, and reduces the cultivated part nearer to the subsoil. This objection has been answered by remarking, that the burning is usually too long continued, and the fire is allowed to get hold of the land, and difficult to get extinguished, and is found to be very prejudicial. From this objection and answer it may be inferred, that so soon as the thin pared surface is reduced to ashes the product should be immediately spread over the land, the fire extinguished, and immediate advantage taken of the active substances that have been produced for manure. It is acknowledged that these lands could not be managed so profitably without the use of this practice. On other lands of any description, it is objected that burning dissipates the vegetable matters, reduces the bulk of the staple of the soil, and that the repetition of the practice has reduced large tracts of land to a state of utter barrenness.

The holders of this opinion also urge that the vegetable matter in any soil should be allowed to decompose gradually, and thus yield a regular support to the growth of plants. In opposition to the opinion that the staple of lands is reduced by burning, and that sterility ensues, may be quoted the authority of many of the most eminent and extensive cultivators in the kingdom, who burned the surface of their calcareous, siliceous, and argillaceous soils in succession, and at no great intervals of time, and have always reaped great advantages, and never have perceived any detriment, but a great improvement to accrue to the land.

Green cropping with sheep-feeding was regularly followed, and dung or composts occasionally applied; and the land being thus improved, was invariably laid down to rest with a sowing of good perennial seeds, and depastured for several years with sheep. On soils of better quality, the rest in grass would not be so necessary; but a duly enriching process of cropping must be adopted to afford the animal and vegetable matters to the soil on all improved and cultivated lands that contain the vegetable matter in a reduced and tender form, and in a finely-blended and comminuted state. Paring and burning of the surface has been condemned by most writers on the subject; and it is a piece of practice that is seldom entertained, but it is doubtful if a smothering combustion of the surface of any land would not be attended with great benefit, either by the common mode of burning in heaps, or by means of quicklime, provided a scorching or torrefying *only* be effected, and violent burning be avoided, and the materials be scattered on the land immediately on the above effect being accomplished.

The inferior lands that are generally improved by paring and burning may be divided into two kinds—clayey and wet, and sandy and dry. On the former, a complete drainage should precede any operation; but from want of the inclination or the means, it is generally overlooked. These lands are usually more or less covered with a coarse foggage—rushes, furze, and heaths, according to the situation; and it is argued by the opponents of burning that that vegetable surface, such as it is, should be rotted on the ground; that it is dissipated by burning, and the land is consequently impoverished. It is granted by them that burning yields quicker manures than the vegetable turf, but that they are sooner exhausted, and the above consequences follow. But the greater part of these lands are unfit to produce crops of any kind without some previous improvement. The first crop is usually turnips, followed by corn and clovers; and these crops being alternated, and the green ones wholly or partly consumed on the land, it admits a fair comparison whether, at the end of four or five years, the burned land does not contain more vegetable matter than another part of similar soil that had been improved by rotting on the surface.

Where the rough foggage is very tall and abundant, much time and labour will be required to rot the surface. Ths reduction of it by a succession of grain crops is impossible, for the quality of the land would not in many cases repay seed and labour; and summer-fallowing must be practised, with the loss of one crop, and with a very imperfect preparation for the succeeding one. In many cases the tough surface could not be reduced for turnips in one or two years, or rather could not be attempted. Where the surface is more tender, rotting has been practised, and the unreduced sods that are produced by cross-ploughing have been gathered and burnt. These modes are more dilatory than the process of paring and burning at once, and sowing a crop immediately; and no decisive authority has established any superiority that they obtain. On lands that possess a quality of producing corn crops, burning may be abandoned, and the sward may be reduced by ploughing and cropping; but years must elapse. The crops will be very worthless; and the practice is often impossible, from the roots of the plants being thrown out, cut and eaten by wireworms, slugs, and insects, which generally infest old pasturage or neglected lands. On inferior soils, wet or dry, that admit paring so as to produce a moderate quantity of ashes, and where the process is properly performed, a crop of turnips or cole will be obtained, which will pay the whole expense of production, not often exceeding £3 per acre, and with a few shillings for rent; and the land will be left, by the turnips being eaten on the ground, in good condition for a crop of barley or oats. Such a crop cannot be prepared in one year by any rotting process, except it may happen in some few cases of sands and chalks; and the manure left by the sheep will amply compensate for any dissipation by burning. By rotting or fallowing the surface, manure must be applied for the production of any crop at the very outset; and the persons who object to burning do not seem to provide it. In many places it cannot be got for money, even if the £2, or the average expense of paring and burning per acre, was doubled or trebled for the purchase. If a piece of poor land, probably worth 10s. an acre, produce a fair crop of turnips at an expense of £3, and if that sum was expended in fallowing another part, the sum of money would be expended in working the land; but the crop of turnips, and the manure that raises them, and which they will raise, do not anywhere exist. The great advantage of burning consists in land producing

by that process a manure for itself, and in producing crops for the future acquisition of that indispensable article. The opponents of burning nowhere give the system of cropping, and the future management of the land that is said to have been reduced to a state of barrenness by that process, nor is there anywhere detailed a comparative and decisive proof of the inferiority of paring and burning to the mode of fallowing and rotting the surface on lands or on fields of similar quality, and which have been subjected to the same treatment after improvement, nor the expense and produce of each mode from the breaking of the old turf till the land was laid out to grass. The great part of the controversy rests on mere matter of opinion, and a more fallacious mode of judgment cannot be adopted than to condemn any practice from the results of imperfect performance; for if strictly followed, it would condemn many of the most approved and useful practices in life; and anything that can be effected to good purposes by others must not be disallowed by those who are incapable of the execution and unwilling to be taught; nor must they allow their avarice and prejudices, narrow judgment and want of energy and exertion, to give a limit to the capacities of other men who may see more clearly and can act more vigorously, and who can bring more judgment and discrimination to bear on the point.

Scientific men have reasoned on very obscure causes as producing the effects that result from paring and burning land; it is thought that clay imbibes nutritive properties from the atmosphere, and that carbonic acid, which in combination with iron is injurious to plants, is expelled by burning. But in the present state of our knowledge of these subjects, we may very properly refer the effects to a diminution of the coherence and tenacity of clay soils, to the destruction of inert vegetable matter, and the conversion of the ingredients into active manures. The ashes of burnt turf from different places have been analyzed, but no conclusions can be drawn from that mode of examination, either of the manner or extent of improvement that may be effected by them. 200 grains from a chalk soil in Kent gave—

Carbonate of lime	80
Gypsum	11
Charcoal	9
Saline matter, principally sulphate of potash and muriate of magnesia and a little potash	3
Oxide of Iron	15
Insoluble earthy matter	82
	200

The insoluble matter would be aluminous and siliceous earths. Gypsum and the oxide of iron are supposed to produce powerful effects on soils which contain an excess of carbonate of lime.

Ashes from another soil were examined, which contained 4 per cent. of carbonate of lime, three-fourths of light siliceous sand, and about one-fourth of clay 100 parts of ashes gave—

Charcoal	6
Common salt, sulphate of potash, and a trace of potash	3
Oxide of iron	9

One hundred parts of ashes from a stiff clay soil gave—

Charcoal	8
Saline matter, chiefly common salt, with a little potash	2
Oxide of iron	7
Carbonate of lime	2

The remainder would be aluminous and siliceous earths. The results would have been more satisfactory if the soil had been analyzed previous to burning, that the change effected on the constituents might have appeared. Some of the above ingredients are very active substances; but the quantity is small, and salt was found in a second specimen from a midland county, as well as in the latter, which was near the sea. The ashes are supposed to inbibe carbonic acid, and by some are reckoned to last many years, by absorbing in winter the elements they lose during the summer. But the formation of charcoal may be reckoned the chief benefit, and some persons have added the oxygenation of the clay by the heat emitted, and also the mechanical effect of the fire in dividing and attenuating the harshness of the soil; but as the process is above ground, and of short duration, and the under-soil is unmoved, much effect may not be produced that way. But it has ever been observed that vegetation is very luxuriant on the places where the heaps have been burnt, and where no ashes were allowed to remain on the ground. *There* the cause of the fertility must arise from the effects of the fire; and the best ashes that could be found on a field have been carried and spread on pared ground where no ashes had been burnt, and they produced effects much inferior to those on the places where the burning had been performed and subsequently spread. It has been most judiciously observed, that there is a cause or agent in burning, and that a most powerful one, "which escapes the retort of the chemist and the *rationale* of the theorist." It remains for the cultivator to take advantage of the effects in the best known way, without wasting time in too minute inquiries into causes which he may never be able to detect, and which, if known, he would probably be unable to direct.

Paring and burning may be commenced in March, and carried on during the summer for the

different crops that may be intended to be sown. So soon as the turfs are sufficiently dried by turning and setting on edge to burn, they are formed into small heaps, four or five yards distant, and may contain 12 to 20 bushels of ashes, and are burned with a smothering fire, by closing the outside and securing the outlets as much as possible. An acre yields on an average about 2,000 bushels of ashes. Small heaps, when circumstances permit, incur less labour and expense, both in forming them and in spreading the ashes. In wet seasons, a larger size may be necessary to produce combustion. All experience agrees in acknowledging that the turfs should only be blackened, scorched, or torrefied, and that violent burning dissipates the vegetable matter, and leaves only the earthy materials reduced to hardened cinders, and useless in the promotion of vegetable life. But there are not wanting authorities in opposition to this opinion, and who have obtained as good crops from earthy cinders as from blackened turfs; but I must say that my own experience in burning on clay soils for several years led to the opinion of scorching rather than of calcination, as the turnips seemed to thrive best on the blackened turfs, from the quantity of carbonaceous matter produced by the smothering fire. If we admit that the fire exerts some latent, or an equal, or probably a superior influence on vegetation to that of ashes, the supposed superiority of scorching over calcination will be much reduced. When the ashes are spread, a time may be allowed for them to cool, and the application of a heavy roll may be useful in breaking the calcined substances, that all the materials on the surface may be pulverized and mixed. Turnip and cole seeds are often sown on this surface, and with equal effect as when the land is ploughed, and the expense of a tillage is saved. Dry and friable soils may be prepared by tillage in the usual way for turnips, and drilled; and also for potatoes, if the land can be so managed in the spring, the latter plant being admirably adapted for a crop after burning. Clay lands will not admit such a preparation, and consequently the turnip or cole seed is sown on the spread ashes and bush-harrowed, or on the land harrowed very fine after a light ploughing. The turnip crop must be consumed on the ground by sheep: if the land be wet it must be drained. If that most necessary of all improvements cannot be effected, and if the wetness of the soil exclude sheep during winter, one-half of the crop may be drawn off, and the remainder eaten on the ground during the dry season in the spring, before ploughing for oats and barley.

On dry lands barley will succeed the turnips, while oats will be best adapted for clay soils that are naturally stiff, and have not been reduced by working during the previous season. Grass seeds or tares may follow these crops, and should be consumed on the ground, or only partly carried off, and turnips or grain crops may follow, when the land may be received into the rotation of the farm. On downs and upland situations, where sheep feed is of the last importance, the land is generally sown for pasture with permanent grasses and sainfoin; but before this is done, the land will be enriched by two or three green crops consumed on the ground, one of which must be attended by a complete fallowing and cleansing process, and followed by *only* one grain crop, and then seeded for pasture. In more adjacent situations, the land may be comprehended under the course of home tillage after the third crop from burning, if the soil be of fair quality; but as paring and burning are generally confined to inferior out-field lands, an enriching treatment after burning must be adopted in order to fill the land with animal and vegetable matters to produce a remunerating pasture. The laying out of any lands to pasture in a state of poverty and weeds after corn cropping has been the cause of many errors in practice, and a ground of complaints against burning; and it is so very contrary to reason, that it is surprising any rational being could entertain the idea, even without any reference to the results of experience on the subject. Lands are also pared and burned for a crop of wheat, when the process may go on during summer, and the land will be ready for sowing in autumn; but the general quality of soils that are improved by paring and burning seldom admit of that crop being used until the land be well wrought, cleaned, and enriched by the subsequent treatment.

The expense of producing a crop of turnips by paring and burning the surface on a clayey soil, which was done under my personal superintendence, was as under:—

	Per acre. £	s.	d.
Paring by manual labour	0	18	0
Burning and spreading the ashes	0	7	6
Ploughing	0	10	0
Harrowing	0	12	0
Seed	0	3	0
Hoeing	0	5	0
	£2	15	6

The land was a black moorish soil, on a bottom of strong red clay, covered with a coarse foggage, not very rank, and not yielding the value of one shilling per acre. The ashes obtained were partly scorched and calcined, and the turnip-seed was sown on a fine harrowed surface after a shallow ploughing. The crops raised in this way for several years more than equalled the expense; the crop was mostly consumed on the ground, and the

succeeding crop of oats averaged five quarters per acre. A ton of clover was cut the following year, and the next crop of oats produced four quarters per acre. The lands were next summer fallowed, and manured with lime and farm-yard dung, and sown with wheat and oats, the former yielding three-and-a-half, and the latter five quarters per acre. The subsequent rotation was three years in tillage and three in grass: the soil being unfit for green crops and for sheep-feeding, the period of three years in grass was substituted for the accumulation of vegetable matter. A very healthy pasture was produced by sowing a variety of perennial grasses; but after three years, on such soils, a renewal will be necessary.

Draining would fit the land for tares and clovers being eaten on the ground. The above rotation may be thought to have deferred too long the fallowing process, and that it should take place soon after burning; but the land was unsuitable for green crops and sheep-feeding, and the above crops were reaped before fallowing, and constitute the produce of the expense incurred in paring and burning the surface. In this case four crops were obtained without any extraneous manure; and the fair comparison lies between the value of these crops minus the whole expense of their production, and the four crops that might be raised by rotting the surface and fallowing at the same cost. The expense of the three last crops might be the same in both cases; and it only remains to expend the 55s. or the cost of raising the turnips by paring and burning, in producing some crop by rotting the surface; and that sum would go but little way in working and manuring the land. On such soils no green crops can be raised by fallowing; and if prepared for wheat or oats, a year would be lost. On these soils burning did not kill the weeds, and proved wholly ineffectual in destroying the wire-worm. Both these productions of nature seem to be lodged beyond the reach of its power.

Some further remarks will close our article. The opponents of paring and burning always acknowledge that it affords two or three good crops without any assistance, and it is certainly difficult to conceive how any practice can be reckoned a bad one that is acknowledged to produce such results; and a farmer who cannot use three good crops with one of corn is ignorant of the principles of his business. The cultivator is responsible for the future consequencee on the land after any manure is applied in addition to the ashes, for after that time a farther expense has been incurred, and neither the good nor the bad consequences can be wholly or fairly charged on the paring and burning.

The minute and accurate reasonings of chemists about the oxygenation of clay, the imbibing of carbonic acid, and the formation of vitriolated tartar in the soil by the process of reducing the surface to ashes, deserve little attention in such cases; the processes of the laboratory are inapplicable to field operations, and the business of the farmer compels him to attend to the general results that are seen to be produced by some powerful cause or agency. The fertilizing effects of fire are undisputed, and experience has shown that it may be applied not only without detriment, but with much profit and advantage. On peaty soils, and in fens and mosses, there is a risk of burning too deep, for if the fire gets hold in dry seasons large masses will be consumed, and the depth of the soil will be reduced; but this danger may be avoided by paring lightly, and by throwing abroad the ashes as soon as produced, and by extinguishing the fire as soon as possible. On improved and cultivable lands which possess fertilizing matters in a reduced and blended state the process has been little used, and is reckoned of doubtful utility. But it is very questionable, as before mentioned, if any surface might not be much benefited by a scorching with fire or lime, and thrown abroad before combustion could produce the dreaded dissipation of the vegetable and volatile matters, or the calcination of the healthy materials. On inferior lands of any denomination that are overrun with a coarse, neglected foggage, and with woody, shrubby, and herbaceous plants, we do not know any such effectual and profitable mode of reducing the unprofitable surface, and of converting the ligneous and fibrous structures from a useless state into active manures that afford immediate support to plants. It is objected that it has done harm; so will any process we adopt, or any implement we use, if they be improperly managed. The cultivation of green crops, the summer fallowing of clay lands, or a dunghill itself, may be useless and even do harm in the hands of a person who knows only one way of using them, and will adopt no other, though it be shown to be productive of very different results. To convince a man against his prejudices, customs, and preconceived opinions, is at all times a difficult task; but to convince a man who has resolved not to be convinced, and to continue in a practice against all reason and experience, is beyond the utmost reach of human capability.

It is stated that many landowners have interdicted the practice partly or altogether; but this objection, and all others of a like nature and from a similar source, must fall to the ground when shown to be grounded in error. When a lease is examined, and a clause is seen restricting the farmer from ploughing or "Denshiring" certain lands that are wholly overgrown with rushes, docks, and

weeds, almost beyond the power of botanist to number, and to let them "remain as they are," and at the same time allowing any form of cropping on the arable lands, and permitting hay and straw to be carried from farms for many years, till no tenant could be found, and selling four corn crops in succession from lands, and sowing them for permanent pasture in that state with seeds from hay-lofts and similar sorts—any objection from such quarters must fail in making impression on any agriculturist against the utility of paring and burning, or any practice whatever. The opinion has been adopted from the results of unskilfulness, prejudice, and avarice—properties of extremely difficult correction; the latter is incurable, for self-interest will ever constitute the most powerful of all the springs of human action. But the farmer very often knows fully as well as his philosophical advisers, and is driven by circumstances to practise against his judgment; want of security, or short security, which differ very little, compel him, as soon as any small improvement has been effected, to turn immediately to the undoing of it, in order to remunerate himself for the outlay, and guard as closely as possible against the chances of forfeiture. And if the man of science who reads the farmer many a severe lecture, certainly not undeserved in many cases, were placed in the circumstances of the latter, he would adopt the same practice: he would try the system that he believed would pay him best for his capital and labour, whether it proceeded from science, from prejudice, or from custom.

Again, we are told that paring and burning have produced very injurious effects in Ireland, but the general management is not mentioned. It is difficult to preserve one's gravity when the example of Ireland, that *anomaly* in the creation, is quoted for or against any position, not only in agricultural, but in any other point of view; the poor inhabitant of the cabin would overcrop the land to raise money to satisfy the demands of the middle-man, or some avaricious tyrant of the fields, and to save the cow from distraint and the pig from seizure and sale; land will be impoverished by such management after any manuring, and the opponent of paring and burning who has quoted Ireland in support of his argument must have been driven to the last resource to catch at a floating straw, and will be mistaken if he wished an authority to be deduced in any matter from that precious example of human mismanagement. The reference can only add another proof that the abuse of any practice takes nothing from the utility, and leaves the intrinsic merit unaffected and unimpaired.

John Donaldson,
An Assistant Drainage Commissioner.

CALENDAR OF HORTICULTURE.—MAY.

Retrospect.—Since the last report, which terminated at the 21st March, some very marked transitions of weather occurred, and these were productive of corresponding results. In 1847, the entire season, to the date when we terminate the present article, was completely dry, and so cold that nature had to struggle against influences repulsive of development and growth. We now are a month in advance, the causes of which may be revealed in the compass of a few lines.

The Meteorological Diary will furnish minutiæ. It may suffice, therefore, to observe that the rain continued to the 30th, with the exception of four days, three of which were gloomy. On the 29th, however, a change of wind to east brought in fine weather, with rapid increase of heat. On the 31st, there were 70° in the shade; on the 1st inst., 94° in the sun; on the 4th, 95°, and in the shade 70° plus. This glorious summer temperature—the sun pouring a flood of light all day long—produced its utmost effects: the earth was warmed to a considerable depth; verdure of every kind covered the ground, and vegetables grew to perfection. Crops of all descriptions, in season, and broccoli in particular, were fine and abundant. The great heat was premature, and would have become injurious; but it declined on the fifth and sixth. Piercing north-east winds, with cold rain, then set in; and we have since had drenching showers, which swamped the land completely.

It is to be hoped that the balance of moisture is now restored to the earth, and that, henceforward, fine and genial weather may be accorded. As a concomitant of some promise, it may be remarked that the oaks are comparatively forward; many expanding their bloom and leaf-buds by the middle of the present month.

Operations in the Vegetable Garden.

Every day's experience proves how much we err by planting fruit trees in vegetable quarters; being intermixed trees, even the smallest shrubs injure, and suffer injury in their turn. The roots of the former draw the ground, rendering it dry and poor; and they themselves are cut or wounded by every kind of tool which can be employed in the

preparation of the land. Many of our market-garden grounds have presented a very bad example in these respects. In field or garden, deep tillage —a proper loosening (and gradual *incorporation* of subsoil, if its quality be good)—and thorough manuring, are absolute requisites; yet who could give the necessary labour among gooseberry and currant trees; and especially if apple and pear trees be also present? There is no economy in the practice; want of space can be no apology, since it is better to relinquish any kind of produce that cannot be brought to perfection.

Fruit trees ought to be grown in orchard-plots: shrubs and bushes in fruit quarters; and vegetables upon open beds and borders, in aspects suitable to the quality and season of each.

Cucumbers and melons ought always to be grown in some department separated for the express purpose, where manures or compost are deposited. And now hot-beds should be prepared, and the old ones at work renewed by linings: the mowings of lawn-grass, placed over the top of these, raise and diffuse a very lively heat. Seeds of cucumbers are sown about the second week, in pots, under hand-glass, preparatory to planting out on ridges, over manure, for the open ground crops.

Kidney and runner Beans:—If the seeds have been sown, and have germinated in pots of dryish earth, the plants can be set out in rows, over manure, whenever the ground shall be warm and friable. At present, so full is the land of cold water, that we fear the result of ordinary sowing. Warm land, freely pulverizable, is essential, as the seeds are very liable to decay.

Sowings in succession can be made of peas; the imperials, dwarf and tall marrow, scimitar, &c., &c. The ground should be rich, as for a dahlia-bed, and the seeds be dropped in two-inch-deep drills, apart and in order; not thickly, as in the winter crops, which suffer so much. Thin, regular sowings succeed best now, provided the peas are not injured by mice. Few peas prosper after the end of May. Sow radish, lettuces, and small salading, two or three times: Cape broccolis in the first week; borecole, German greens, Brussels sprouts, at the same time, for the last crops. Onions and carrots to be drawn young. Spinach, twice: the broad-leafed, prickly-seeded, succeeds as well as the round-leafed, and is, perhaps, less likely to run; the two mixed are sometimes used. Endive, a drill or two for very early supply. Sweet-herbs may be sown; but transplanting in showery weather is preferable. Sow Indian-corn about the 15th.

Routine operations.—Top beans and peas, and stick the latter in a neat and orderly manner, so as effectually to prop the plants; then hoe the surface, and draw a little earth toward the plants. Earth-up crops and hoe the surface. It would be useful to lay an inch of half-reduced manure at top, to keep in moisture during hot weather, and to afford liquid manure by the falling showers. The dry manure left could easily be forked in, at any time. Asparagus will now be in full bearing: let it be cut over with great care, always leaving a shoot to each crown. The alleys may have more dung laid on, and salt can also be sprinkled over that; but not a particle must touch the growing shoots. Hoe and clean seedling beds. In pulling rhubarb leaves, let each be scaled off with a side twice; but avoid the knife. Sea-kale beds, or rows, are to be cut over, and thorough-dressed at top with sand and manure; or with manured earth from the alleys, if it be of a light, friable quality. Brick-pits for kale are, I think, preferable: built in a melon ground, and of size proportionate to the demand, the crop would remain for years, and would be brought into season at any period between November and April.

Fruit Department.

Apricots:—Thin out the young fruit, if required, to about double the quantity intended to ripen; the age and strength of the trees must be the guide. Disbud all the stone-fruit trees, by nipping, with the finger and thumb, every fore right and back young shoot, also those that will not furnish well-placed succession bearers. This is a nice and most useful operation, and obviates the use of the knife upon wood which ought not to have been permitted to exist. Treat espaliers in the same way, excepting apples and pear-trees which having been already pruned back to the spurs, are to be left to the Midsummer regulation. The worst enemy of the peach-trees is the "bladder blight," that puckers the leaves, subjecting them to aphides in amazing excess. This disease appears to originate in a too copious flow of sap, induced by rich soil and early warm weather, succeeded by frost at night. I know of no remedy but protection by glass, or covers of bunting. G. Lindley, in his "Guide to the Orchard," instructs to "pick off all curled and blistered leaves, and burn them without suffering them to fall on the ground; then to wash the trees with the engine, after the middle of the day, but not so late as to prevent them from becoming dry before sunset." He recommends dusting or dredging with flour of sulphur (to which I would add about one-third of Scotch snuff), if insects or mildew appear. This dressing should be made while the leaves are moist.

Strawberries:—Cover the intervening ground with short grass, to keep in moisture: spent hops are excellent. Thin sticks, placed double along the rows, round which fine twine is alternately

passed the whole extent, will keep the trusses upright, and greatly improve the fruit.

Vines:—Regulate the shoots frequently, and nail those that show fruit, so soon as the wood will bear the fixing. Stop each bearer, nipping off the shoot at two or three buds above the cluster.

Flower Garden.

The ground being nicely prepared, sow successional annuals. Plant others that were raised in pots, attending to the heights, figure, and respective colours. Much taste and correct knowledge of habits are required in laying out miscellaneous beds and borders. Shrubs of small dimensions are generally to be preferred to herbaceous and annual plants; the latter being adapted to parterre-beds. These must be thought of early in the month; and the first step to be taken (where perfection of flower and foliage is contemplated) is to dig out and remove the last year's soil, and to replace it with entirely fresh earth, suitable to each individual tribe. Thus, loam and perfectly decayed manure will suit geraniums, petunias, verbenas, and the like: decayed leaves are most congenial to the lobelias. Sandy heath-mould, or that peculiar kind of earth found on Mitcham Common, is required for *portulacca mesembrianthemums*, and the hair-rooted tribes. The excellence of the last-named soil requires no further proof than the high condition and beauty of all the American plants, at Messrs. Rollison's garden on that common. The greenhouse plants, and others preserved in pits for the purpose of bedding out, must be gradually hardened by increased exposure, prior to the 15th of May, when we may expect settled weather. The reader should, however, be reminded that in 1831, after great care and watchfulness, the Dropmore Gardens lost, by one or two hours' frost, after 3 o'clock in the morning of the 7th of May, above 500 plants intended for the parterres. I also, on the 16th of May, 1837, had every shoot upon a grape-wall killed back, by a night frost, succeeding to a heavy snow in the afternoon.

It were superfluous to re-urge the most sedulous attention to neatness and order, in every department of the garden, culinary or ornamental.

John Towers,

20*th April*. Croydon.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR APRIL.

Scarcely within our recollection has so much rain fallen in this country as during the last two months, but more especially in that now just brought to a close. As might, therefore, be expected, all out-door farm labours have progressed slowly, and under the most disadvantageous circumstances. The interval of fine weather, experienced from the 10th to the 16th, enabled our farmers to set the plough in motion; and very extensive breadths of land were sown with spring corn—not, however, in the best order, from the land working somewhat "unkindly." Since the latter day, very little progress has been made in the fields; and we may observe that we have seldom witnessed, at this particular period of the year, so small a quantity of corn sown as at the time we are writing. In some parts, even on the upland soils in Kent, &c., scarcely any barley has been got in; and it has now become a question whether the land in some quarters will not be thrown out of its usual course of cropping, and from which the most unfavourable results may be expected. Much, however, depends upon the next fortnight. Should it prove dry, most of the corn will doubtless be sown; but a continuous wet will be highly prejudicial to the interests of the agricultural body.

From most parts of the United Kingdom, we have been favoured with communications on the subject of the appearance of the winter wheats. Our correspondents agree in stating that it is anything but flattering (a great change for the worse having been lately observed); though the plants are by no means too forward.

About the usual quantity of land has been planted with potatoes this season; but the prevailing wet weather has greatly interfered with the sets planted this year, as we understand that immense quantities have become entirely rotten, and a re-planting has become necessary. The stocks of potatoes on hand are represented as seasonably good; and the various markets have been well supplied with most kinds, which have met a dull sale, at drooping prices. During the month, nearly 3,000 tons have arrived in the port of London from Holland, Belgium, and Germany, and which have sold at very low figures—say, from 70s. to 100s. per ton.

The "puddled" state of the pastures has induced not a few of the flock-masters and others to withdraw their stock to the homestead, notwithstanding the supply of grass is somewhat abundant. Large quantities of dry fodder have, in consequence, been consumed; yet the prices of both hay and straw, from their comparative abundance, have ruled low.

The lambing season has passed off remarkably well. The fall is represented as a good one; and the general health of the lambs does not appear to have suffered from the inclemency of the weather.

In Smithfield and elsewhere, very high prices have been again realized for fat stock. Store animals have produced very full currencies. The general provision markets must be considered steady.

The corn markets have been far from active; nevertheless, no material change can be noticed in the quotations. The imports from abroad have been seasonably good.

In Ireland and Scotland, farm labours have not progressed very satisfactorily, from causes to which we have already alluded. The corn markets have ruled tolerably firm, and former prices have been nearly supported.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Notwithstanding the unfavourable weather experienced during the greater portion of the past month, the accounts which have reached us from our large grazing districts are to the effect that the stock—though it has been in many instances withdrawn from the pastures—has fared tolerably well; yet the actual purchases of store animals have fallen short of the general run of years from the want of accommodation on most farms. On the other hand, the prices demanded for half-fat beasts and sheep have ruled extremely dull.

The supplies of beasts, lambs, calves, and pigs, on offer in Smithfield and the large provincial markets have been tolerably extensive, and of full average quality; but those of sheep have again exhibited a serious deficiency. In the early part of the month the general demand was active, at further improved currencies; but towards its close it became heavy, and prices had a downward tendency —say from 2d. to 4d. per 8lbs.

From Holland and other parts of the continent the imports of live stock into London have been somewhat extensive, or as under—

	Head.
Beasts	2,456
Sheep	2,479
Calves	466
Total	5,391

At the corresponding period in 1847, the total importation consisted of 5,826 head. More sheep would, doubtless, have arrived this season had they been fit for the butcher; but the fact is, the shippers have discovered that to send them here in a half-fat state is to ensure the certainty of a heavy loss. At Southampton, 123 head of beasts have been landed from Spain in very good condition; and at the northern ports, about 2,200 head of beasts, sheep, and calves, mostly from Holland and Germany. The foreign beasts still carry a very large quantity of internal fat; but the sheep and calves are in by no means first-rate condition.

The following statement shows the supplies of fat stock on offer in Smithfield Cattle Market, since our last:—

	Head.
Beasts	15,322
Cows	577
Sheep and lambs	82,310
Calves	1,375
Pigs	2,818

CORRESPONDING PERIODS.

	April, 1845. Head.	April, 1846. Head.	April, 1847. Head.
Beasts	12,800	15,224	17,810
Cows	600	587	461
Sheep and lambs	110,400	91,620	103,620
Calves	600	905	1,049
Pigs	1,600	2,351	2,570

The bullock supplies have been chiefly drawn from the counties beneath stated:—

	Head.
Eastern counties	5,400
Northern, western,	3,500
And midland ditto	3,500
Other parts of England	1,350
Scotland	840

During the month, the average prices have ruled thus:—

Per 8lbs. to sink the offals.

	s.	d.		s.	d.
Beef from	3	2	to	4	8
Mutton	3	6		5	6
Lamb	5	8		7	0
Veal	4	0		5	2
Pork	4	0		5	0

COMPARISON OF PRICES.

	April, 1846. s.	d.		s.	d.	April, 1847. s.	d.		s.	d.
Beef, from	2	4	to	3	6	3	4	to	4	6
Mutton	3	4		4	6	3	10		5	8
Lamb	5	4		6	8	5	4		6	4
Veal	4	4		5	4	4	2		5	4
Pork	3	4		5	2	3	10		5	0

Up to Newgate and Leadenhall the arrivals of country-killed meat have been small, on a comparison of years. Generally speaking, the trade has ruled steady; and prices have been fairly supported.

EDINBURGHSHIRE.

The weather is now looked to with unusual interest. The last few weeks have been, on the whole, favourable for sowing the spring corn, having been

dry, with few interruptions, up to the 19th inst., and I think we can now report the great bulk of the spring wheat, oats, and beans to be sown, and a good proportion of barley likewise, but there yet remains a part of this latter grain to be put in, which is delayed on account of the difficulty of getting the fields cleared of the turnip crop. The weather, though dry, has been very cold and frosty, which has kept back vegetation exceedingly; but we are now favoured with a copious fall of rain, which will be of benefit if succeeded by drought and heat, whilst a continuance of soft weather at present would be extremely hurtful to young wheats, and at the same time keep back field labour, which must be regretted at the present time. The appearance of the autumn-sown wheat is fair, and only requires fine weather to make it look well. Spring wheat is sown to a more limited extent this year than usual, owing to the extreme wetness of March, which made it hazardous to sow later in the season. There is already a good many potatoes planted in the neighbourhood of Edinburgh, with the expectation that they may be sold early to better advantage. As stated in our last report, there will be a good many potatoes planted this year, and there seems quite sufficient exposed for sale to satisfy the liberal demand; there are numerous varieties in the market, and from all parts of Scotland, from England, and the continent; those from the high mossy soils to the south-west of the city are in greatest request, and command the highest prices; they are of the "Don" and "Buff" varieties, and are selling from £6 10s. to £9 per ton; next in repute is the "Orkney reds," chiefly from Orkney, and which proved good doers last year; they sell from £5 10s. to £6 10s. per ton. There are numerous other sorts, from Ross-shire, Morayshire, and Yorkshire, which are selling variously from £4 to £6 6s. per ton. Turnips are still very plentiful, and can be had almost for nothing, which proves the crop of last year to have been an exceedingly good one. Our grain markets have been excessively dull during the past month; there has been a rather improved feeling at our latest markets, produced by the slight advance reported in those of the south. It is very hazardous to predict how prices may range for the future, as these must be very much influenced by the state of the weather and the political movements on the continent of Europe. The cattle trade now participates in the depression which characterizes every other article of trade, and prices may be noted a little lower. Nevertheless, the price of butcher meat is relatively higher than almost any other article of general consumption. We are still of opinion that the value of fat stock will recede a little as the season advances. —April 22.

GLOUCESTERSHIRE.

Much rain has fallen during the present and past month, to the retardation of the farm labour at this period of the year. So much rain has fallen that serious apprehensions have been entertained for the safety of the wheat crop, though the present auspicious and genial change, should it luckily continue, will do much to alleviate all unfounded anxiety. From the excessive fall of rain, however, the farmer has been justified in his apprehensions, though no visible symptom has been evinced of the crops having sustained any injury by an enhancement in our quotations; the reverse has been the case, which must be evidently assigned to the counteractory effects of political excitement. Most serious complaints have reached us of the sickly appearance of the wheat upon the hills and in the vale: yet fine and favourable weather will effect wonders for its speedy restoration. On the heavy, stiff, tenacious clay lands, the wheat has assumed a yellow and most unhealthy aspect. Much barley still remains unplanted, the weather having prevented the farmer from getting upon the land, and it is consequently obvious that it will be late. Should fine weather continue, much will be sown during the succeeding week. The beans, upon the whole, look well and forward, though many exceptions could be adduced to the contrary. The present season has inculcated to the farmer the imperative necessity of a good and extensive system of draining, for nature herself propounds its utility, if man, who professes to reason from analogy, would, at the present time, contrast crops upon well and badly drained lands, and come to that honest decision, resulting in practical conviction. The early and other fruit trees look well, and from present appearances, could we exclude the fatalities of the future, an abundant crop might be anticipated. The potatoes that are up look healthy, but it would as yet be premature to advance an opinion. What is now most required is a subsidence of political humbug and morbid excitement. The middle classes do not comprehend their own moral power to resist aggression; and the working classes cannot be made cognisant of their own folly and political extravagance. Republican France has kindled the flame of anarchy under the hypocritical mask of liberty and equality. But there is not a sufficient accumulation of combustible matter in England, thank God, to raise that horrible conflagration which timid and imbecile men dread, to the detriment of their own peace and that of their country. This political excitement is excessively onerous and injurious to trade collectively, for never has a more bigotted and indomitable spirit of hellish intolerance found pervading society than at the present time; and any

man expressing sentiments that may be defined or contorted as approximating to those of any popular movement, might as well bear the despicable brand of felon upon his forehead. Although we deprecate any measures that are calculated in tendency to destroy confidence, depreciate capital, injure, restrict, or paralyze commerce, or shake the basis of our ancient institutions, we think that a considerable extension of the suffrage may be necessary, and that the British farmer should be up at the present crisis, to effect and establish those measures which he has so long advocated, still agitates, and considers his due.—April 22.

SOMERSETSHIRE.

We have now witnessed since our last report a greater succession of heavy rains than we have had in this month for years; its effects are but too visible on the wheat plant on clayey soils. This month was ushered in by as warm weather as has been remembered for years, and it is very remarkable that on the 3rd the cuckoo was *seen* and heard by several on whom we could depend. We have been in the habit of noticing the coming of our summer visitant, and never remember this bird earlier than the 16th or 20th; a friend informed us he once heard it as early as the 8th, but no one, that we can find, as early as the 3rd. The severe frost we had the first week cut the potatoes up; and the wheat plant, where the land was wet, soon showed its effects. The weather got colder, and up to yesterday and the day before the voice of the cuckoo was no more heard in the land, that we can find. The rain which we have had during the past week has nearly stopped out-door proceedings, and there is yet much barley, oats, and potatoes to go in, besides other seed; but the effect on the wheat plant on the strong clays and other wet soils, not well drained, is serious. Fine warm weather may recover some of the lost prospect, but the lowest estimate of the lessened produce cannot be less on wet lands than 4 to 6 bushels per acre on wheat, even with a good kern; not that there will not be sufficient plant for an average crop with a propitious season from this time, but compared with last month's prospect of more than an average crop, from the appearance of the plant. Now, as regards the stock in the farmer's hands, it is always difficult to estimate; but from what can be gathered, we should suppose it is rather beyond an average for this period of the year. In the early part of the year there was less than usual forced into consumption, but for the two last months the deliveries have been very great; and there are still some large quantities held back in consequence of the present reduced rates, and also the disinclination to purchase by the miller. It must be remembered against this that both millers and bakers are acting on the system of hand to mouth, and in their hands there is less than average stocks, and likely to be while bankers continue so stringent in their accommodation. We think it not unlikely we may get up to 6s. 9d., and, if the weather continues wet, 7s.; but it is very difficult at any time, and particularly at this period of the year, to form a correct opinion of the future range of prices. One thing is pretty certain, that we shall have to draw from our present stock the supplies for four months of more than average consumption, and that these supplies will be held with more firmness in descending markets than they have been, as the parties will be more able to do so. Barleys have kept up their prices more than any other corn in proportion to the crop, but the seed for this year has gone in very badly. Peas and spring beans are looking well, but there is a blight about the leaves of the winter ones, and we have had too much wet for them lately. Prime wheat about the commencement of the month was worth 6s. 9d. per 62lbs., but they have gone down to 6s. 3d. and 6s. 6d. per 64lbs.—the lowest rates, we think, for the present; and the whites 5s. 9d. to 6s., red 5s. 6d. to 6s. Barley has advanced from 4s. to 4s. 3d. Beans a better sale than a month since, at 4s. 6d. to 4s. 9d. Peas 5s. 9d. to 6s. Oats are in more request, at 18s. to 22s. per qr., and for seed 24s. Our meadow and artificial feeds are rather forward, and rye, which can be cut and fed in-doors, has come in well; for such has been the quantity of rain, that our lands are very soft, and some of the lowlands have been under water; and great fears have been excited of a very extensive injury from floods. Out-door operations have been nearly suspended, and farming operations are now out of season. A good breadth of potatoes has already gone and will go in this season. This week at Glastonbury market, Somerton fair, and Bridgwater market, there was (and particularly the two former) a good show of stock, and more good beef than we have seen for some time, which went off at rather lower prices: whilst in fat sheep the late high prices were supported. At Somerton, in poor stock, although it was a very wet day, a large business was done, both in sheep and cattle, at good prices, particularly the former, to the sellers. At Bridgwater, yesterday, there was a large supply of poor sheep, and a lack of purchasers; we think it likely that we have seen the highest figures both for beef and mutton. A few lambs have made their appearance; we may have an early supply, but the weather is against their being good. Wool has again got back into its former state of inactivity. Cheese continues a steady sale at steady prices—50s. to 60s. Best Somerset bacon, 7d. to 8d. per lb. Pigs, fat, 9s. to 9s. 6d. per 20lb. Beef, 9s. 6d, to 10s. 6d.; mutton, the best, 8d. per lb., have been our late prices for meat. Butter, 10d. to 12d. Veal, 4d. to 6½d., according to quality. Calves being very plentiful may be had from 8s. to 12s. each, a week or ten days old.—April 21.

DURHAM.

The month of March was excessively wet, scarcely having a single fair day; the land became so saturated and soddened with moisture that the plough could not proceed, and outdoor work of every description was thrown considerably in arrear. A large breadth of Lent corn yet remains to be sown; from the absence of frost during the winter, and from the unusual quantity of rain, falling in the spring months, the land has worked exceedingly stubborn and unkindly. From the ex-

treme humidity of the season a very small quantity of spring wheat and beans has been sown, and the small quantity that was committed to the ground was under unfavourable circumstances. The winter wheats are not too forward, but looking healthy; and should the weather now prove favourable, the prospect is cheering. The breadth of autumn wheat does not exceed an average one. A large quantity of grain was thrashed out last month and sent to market, which was productive of a downward tendency in prices—below a remunerating point to the farmer. A fall in the value of farms has taken place this term, compared with the last, in some instances to a large amount. Free trade was to produce wonders, and no one can deny but it has; it has been productive of misery and starvation to this country. The meadow pastures never appeared more promising, and clovers and seeds cannot be surpassed, and sheep and lambs are doing well upon them. We have been well supplied with potatoes, and prices are considerably lower. Owing to the unfavourable weather very few have been planted: we have seen no appearance of rot this season. Our corn markets have been well supplied with grain, and prices considerably lower. Hay has fallen £2 per ton. Cattle markets have been well supplied; the trade has ruled firm, at remunerative prices. Good draught horses are very scarce, and sold at high prices; railway contractors purchasing to a large extent. Labourers' wages are much lower, and employment difficult to procure, and hands out of employment are increasing; they are sickened of the free trade, and wish to return to the sliding scale once more.—April 18.

SUSSEX.

The few dry days we had at the end of March and beginning of April helped the farmers forward with the season; and most of the beans, peas, and oats were got in well. There are still, however, some remaining to be sown; and the late cold weather has much retarded the progress of the spring work. The barley season is getting behind, as well as the turnip land; but there is yet time, if we have a little dry weather. Everything is looking blank, and feed is getting very scarce; but the wheat as yet keeps up its colour, and is generally looking well, though in a great majority of cases it is rather too thick on the ground. Some time since, we spoke of the futility of this rushing into extremes, when, from some secondary cause, the thin sowing has failed in a solitary year, or in a few isolated instances; and we see now that many thickly-sown pieces are getting tufty or patchy. When this is the case, a good crop must not be looked for: wheat, like other grain, will not prosper, unless it grows evenly. This tufty appearance shows that the ground is overstocked, and that, with the exception of here and there a patch, there is not strength enough or food enough to carry up the crop. The wet winter has had a good deal to do with this, as the properties of the land necessary to produce a crop have been deluged, and constantly saturated. Never was the want of proper draining more completely shown than this spring; for we do not find this effect on the wheat where the water has been carried off. Rain, if allowed to escape as fast as it falls, does not do any mischief: it is the retaining it in the soil that does injury. Rain contains in itself a great deal of nourishing and manuring qualities, which it leaves behind as it filters through the soil, as may be seen by taking a quantity of water fresh from the mouth of a drain, and some from a rain-water cask, and comparing the two, after allowing them to stand a few days. The one will be found comparatively pure, and the other impure and filthy. Let the season be ever so dry, draining is requisite; for it gives a chance for the roots to get down and seek for food, which, with the help of the subsoil-plough, they are sure to find: and in a wet season like this it gives the farmer a far better chance of making a good bed to receive the seed, as the top of the furrow dries quickly, and there is sure to be grit if the land gets sound enough to bear the foot of the horse. Where the water has been held lingering about the surface for want of drainage, we have seen, this spring, the furrow come up whole; and as soon as the dry weather set in for a few days, it had become steely at top, while below the furrow it was cold and wet, with the surface beginning to crack; and on such land a crop is almost hopeless. We have seen some few instances on wet soil, where the trefoil has been drawn during the wet weather, and its chances cut up and settled by the hot sunny days. This, again, is the effect of non-drainage; but, on a general scale, trefoil as well as other young seeds are looking well, although at present the growth is checked. Tares promise as well as the weather will allow; but rye has received a very sensible check, and looks as if it was getting sticky, which must be expected to be the case as soon as the growing weather sets in. There will not be a large breadth of potatoes planted this year in this district; but the value of carrots and parsnips is beginning to be appreciated, which roots, with mangel-wurzel, will be more cultivated than usual. Draining and subsoiling have done this; and if it was not for these farmer's helpmates, we should now be in a woful state from the loss of the potato crop. Lean stock comes out lean stock in earnest this spring. Sheep are also in low condition, but prices are good. The show of two-toothed tegs is not nearly so good as usual; but anything that looks like making mutton sells readily. We heard a Surrey gentleman state at Lindfield fair that good tegs were worth 1s. per lb., standing weight; and he valued some sold there at nearly, if not quite, that price. Both beef and mutton are fetching a high price. Lamb we can say nothing about, as very few lots are forward enough to be saleable for some weeks; and then, as they grow so slowly, and the ewes are in low condition, they will not come out prime. Wheat has receded again in value, and sales are dull. There are various opinions about the probable prices during the summer months; but we do not think any material advance is to be expected, nor do we anticipate the low figures prognosticated by the alarmists. Perhaps £12 per load will not be very far from the rallying point. One thing is certain—the monetary crisis, the want of confidence, the disinclination to speculate, together with the alarming state of European affairs, will prevent prices getting up

very high; and we have a good stock of both home-grown and foreign on hand, with a certainty of nearly all the arrivals being forced on the market as soon as they come in. On the other hand, there are many reasons to prevent it getting very low in price. The importations, although they will probably be considerable, are very uncertain; and in that "El Dorado" of a country with the free-traders, America, the price of flour is as high as in London. Therefore Jonathan will not deluge us with his produce. Then there is no prospect of an early harvest—that is out of the question; and food must be had to feed the people until it comes. We do not know what effect the continental revolutions may have on the markets, as everything depends on the turn affairs may take among the leading nations during the next few weeks. Should war arise, it will influence our prices very materially; for John Bull will not be able to keep his fingers out of the mess, if other nations go to loggerheads; but if Europe keeps in peace, we expect to see the markets go fluctuating along in a jog-trot fashion until after another harvest. We do not feel the want of employment among the agricultural labourers so much as some districts in the Weald, as the slips on the railway have taken off our superabundant hands, and kept them at work. There has also been a good deal of underwood-cutting this winter, and a few warm days will set the hands on tan-flaying; so that we really are not so badly off as our neighbours.—Brighton Gazette.

KIRKCUDBRIGHT.

The 10th current was very cold: there was a withering easterly wind; but in the afternoon there were heavy showers of hail and rain. Next morning there was the keenest frost that has been experienced during the present month; Cairns muir and other mountains had a slight covering of snow; and the lofty mountains in Cumberland were arrayed in their winter's mantle. Had evidence been wanting of the changeableness of our climate, there has been an abundance of it since April began. For some time past there has been frost every morning; but, nevertheless, farming operations have been but slightly interrupted, though vegetation has been checked. Though there was some sowing in March, it was not general until the 3rd current, but since that time it has gone on rapidly. Not a few extensive farmers, who do not cultivate sheep husbandry on a large scale, completed their sowing on the 14th, while others who have still a considerable breadth of turnips unconsumed will not finish before the first week in May. Turnips are in many places so plentiful that we have recently seen cows, sheep, and two-years-old cattle feeding promiscuously in the fields, that oats and barley may be sown before the season is too far advanced. Some of the finest barley soils that are already tilled will probably not be sown before the 21st, though several of those who rarely sow more than twenty bushels have already committed the seed to the earth. On the afternoon of the 15th, the wind veered round to the south, and for two hours there was a fall of rain. The air is still cold and ungenial, the wind whistles loudly, and a fall of moisture is anxiously wished for. Some of the turnip fields are so dry that with the trampling of stock they are tilled with unusual difficulty, and a copious fall of moisture would modify the air and set free imprisoned vegetation, which has been checked by untimely frosts and parching east and north winds. The fields are still bare, but in many instances turnips are daily carted into the fields, so that the scarcity of herbage is not felt in the same way that it was twelve months ago. We never saw turnips so plentiful and so cheap: in some places they were sold at 4s. per ton; while in others no charge was made if sheep consumed them in the fields where they grew. Only a few of the best wedders have as yet been sent to Liverpool, but numbers will be forwarded by every steamer until the stocks are exhausted. Though inlaid prices were high, keep has been abundant, but it cannot yet be determined if living profits are to be realized. We know one person who recently refused £3 per head for a lot of prime wedders, but it was an exception, and it is probable that very few are equal to it. Hogs (Anglice hoggets,) have been in quick demand, and many lots have changed owners at from £1 10s. to £1 15s., and in some rare instances £1 17s. per head, leaving remunerative profits after outlay, keep, and risk. It is now generally stated that the lambing has gone on more unfavourably than usual, that great attention and watchfulness are required, and that, notwithstanding uncommon care, the deaths are very numerous. We know one farmer who has already lost ten ewes out of about one hundred and twenty, and not more than the half of that number have lambed. About six weeks ago the accounts from the hills—that is, of the sheep stocks—were highly unfavourable, and it was apprehended that the crop of lambs would be smaller than usual. During the winter a great number of the breeding ewes had died through exhaustion, partly in consequence of the scantiness of food during the last spring and early summer. The planting of field potatoes has not generally commenced, though numbers of farmers are preparing the ground. We know one who planted one hundred bushels before he began the sowing, and he means to plant at least two hundred more. The seed is fresher than it was expected to be, and in many instances double the quantity will be planted. Now that many of the pits have been opened, the seed is more plentiful than was anticipated; and, all things considered, prices are by no means so unreasonably high as they were twelve months ago. The best cups and second early are 2s. 6d., and sleepers or Highland Cheftains, 2s. per bushel. The finest first early are from 3s. to 3s. 6d., and last year the same kind brought from 4s. 6d. to 5s. per bushel—an enormous price, which was not equalled in 1800, the spring after, perhaps, the most unpropitious harvest during the previous century. Notwithstanding the extra quantity that many persons are about to plant, the stocks of apparently sound tubers are larger than it was generally expected they would be, and it is to be hoped that the labouring classes will be enabled to obtain a few bushels each, so that their food may be increased.—Ayr Advrtiseer.

FATTING PIGS ON PARSNIPS.—A correspondent has written to us, to inquire, "Whether we knew, practically, the quality of the parsnip for feeding and fattening pigs?" In answer we beg to state, that at our farm at Oatlands, Ringmer, we have been in the habit of employing parsnips for that purpose for some time. Upon reference to our books we find, that on the 11th of October, 1847, we put up two shuts, of eleven weeks old, and fed them on skim-milk and parsnips for three months, when they were killed, weighing 16½ and 17 stones. They were well fattened, firm in flesh, and the meat of excellent flavour. The quantity of parsnips consumed by them was nine bushels each. This plan of fattening we think well adapted for the cottager.—Sussex Express.

METEOROLOGICAL DIARY—1848.

	Barometer.		Thermometer.			Wind and State.		Atmosphere.		
Day.	8 a. m.	10 p.m.	Min.	Max.	10 p.m.	Direction.	Force.	8 a. m.	2 p. m.	10 p. m.
	in. cts.	in. cts.								
Mar. 21	28.93	29.50	34	44	36	N. West	bsk. calm	cloudy	cloudy	fine
22	29.64	29.70	34	44	44	S. West	brisk	fine	sun	cloudy
23	29.70	29.92	48	57	48	West	lively	fine	sun	cloudy
24	30.06	30.16	45	52	48	W. by N.	gentle	cloudy	cloudy	cloudy
25	30.20	30.15	41	48	44	N.W., N.byE.	gentle	cloudy	cloudy	cloudy
26	29.96	29.80	46	48	46	S. West	lively	cloudy	cloudy	cloudy
27	29.80	29.78	44	54	48	South by East	gentle	cloudy	cloudy	cloudy
28	29.80	29.90	42	56	46	S. West	gentle	fine	sun	cloudy
29	29.94	29.96	44	60	46	S. East	gentle	fine	sun	fine
30	29.89	29.90	45	56	50	S.E., S.W.	variable	cloudy	cloudy	fine
31	29.98	30.08	46	70	56	S. Easterly	gentle	fine	sun	fine
April 1	30.10	30.10	46	70	56	N. Easterly	gentle	fine	sun	fine
2	30.—	30.—	46	71	56	N. East	lively	fine	sun	fine
3	30.04	30.09	47	70	57	S.E., S. by W.	gentle	fine	sun	fine
4	30.11	30.12	48	70	61	N. West	gentle	fine	sun	fine
5	30.10	29.83	50	62	50	Variable	variable	cloudy	fine	cloudy
6	29.80	29.78	43	55	42	N. East	lively	cloudy	sun	fine
7	29.72	29.55	40	45	41	E. N. E.	gentle	cloudy	cloudy	cloudy
8	29.45	29.51	38	42	39	E. N. E.	lively	cloudy	cloudy	cloudy
9	29.61	29.61	38	44	36	E. N. E.	lively	cloudy	cloudy	cloudy
10	29.59	29.47	33	48	44	S. West	lively	cloudy	cloudy	fine
11	29.70	29.80	35	52	43	N. W., S. W.	gentle	fine	sun	cloudy
12	29.59	29.66	40	56	47	Westerly	gusty	fine	cloudy	cloudy
13	29.74	29.69	45	54	47	Westerly	gentle	cloudy	cloudy	cloudy
14	29.89	30.10	39	55	43	N. West	gentle	fine	sun	fine
15	30.09	29.93	37	47	42	S. East	gentle	cloudy	cloudy	cloudy
16	30.05	29.90	42	53	47	S.E., S.	gentle	cloudy	cloudy	cloudy
17	29.72	29.80	46	57	47	West	gentle	fine	cloudy	fine
18	29.78	29.49	43	53	48	S. East	gentle	cloudy	cloudy	cloudy
19	29.49	29.49	43	58	50	S. East	gentle	fine	sun	fine
20	29.49	29.46	43	53	50	N. East	gentle	cloudy	cloudy	cloudy

ESTIMATED AVERAGES OF APRIL.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.54	29.200	74	29	49.9

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
55.0	42.3.	48.65

Weather and Phenomena.

March 21: Rain and sleet. 22: Changeable. 23: Fine spring day; red sunset. 24: Overcast; drying air. 25: Heavy high gloom. 26: Change, rain after sunset. 27: Much rain; changeable. 28: Fine spring day. 29: Splendid burst of weather continued to the end.

Lunations.—Last quarter of the moon: 28th, 1 h. 19 m. morning.

April 1: Superb and hot, distant thunder. 2: Beautiful. 3: The same. 4: Great heat, 95° in the sun. 5: Overcast; accumulations of clouds; cold afternoon. 6: *Rain* early; keen air. 7: Great change; cold, rainy clouds. 8: Still cooler; *rain* returned. 9: Cold, gloomy; rain at night. 10: Snow; rainy afternoon. 11: Fine, changeable. 12: Thunder-showers. 13: Very wet afternoon. 14: Very fine; after sunset a change again. 15: Cold, cloudy; showery afternoon. 16: Sober cloudy day. 17: Fine forenoon; thence showers. 18: Very rainy afternoon. 19: Sober day, but with occasional gleams. 20: Profusely wet.

Lunations.—New moon: 3rd, 11 h. at night. First quarter: 10th, 2 h. 50 m. afternoon. Full: 18th, 2 h. 31 m. afternoon.

REMARKS REFERRING TO AGRICULTURE.

The rain has again been profuse, too much so for the healthy improvement of the wheat, or the sowing of spring corn. Great effects were produced by fine weather commencing March 29; everything advanced, and much seed was sown; the rain may prove a balance, and restore the want of ground moisture, still the continued fall of rain causes solicitude. The crops of every kind are looking very fine.

J. Towers.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

AYLESBURY FAIR.—We had a good supply of all descriptions of cattle and sheep. Good horses realized high prices, but the trade was by no means brisk. Good fresh barren cows were much sought after, and fetched high prices—say from £14 to £18 each. Down calving cows, adapted for the London markets, were also a very good trade, making from £15 to £20 each. The best calving heifers were a dull sale, whilst the middling and inferiors were difficult to dispose of, even at very low prices; in fact, we never remember seeing this description of stock a worse trade. With sheep the fair was completely glutted, and the trade was very dull, and a great many returned home unsold; yet the few disposed of realized high prices. Pigs were very plentiful, and lower in price. —*Bucks Chronicle.*

BODMIN FAIR was attended by several eastern dealers, but on account of the unfavourable weather in the morning, there was not a large supply of cattle. Oxen and steers sold very freely, but the sale of fat cattle was dull. The garlands for the oxen were awarded to Mr. Wm. Rowse, of Lancarffe, Bodmin; those for the cows to Mr. Gatty, of the Town Arms, Bodmin, and Mr. Higman, of Lanivet. The price of fat cattle appeared rather to have declined, the garland oxen and cows having been sold at about 58s. per cwt., whilst other fat bullocks varied from 52s. to 56s. The sheep fair was not large, but most of the sheep sold fetched about 7½d. per lb.

BRAMPTON FAIR.—The show of cattle and sheep only limited, and the demand very slow, many being returned unsold.

CAISTOR FAIR.—At this fair—by far the largest in England for one particular class of sheep, viz., lamb hogs—there was the largest show of sheep ever witnessed, the numbers being estimated at from 40,000 to 50,000, in fine condition. The trade began rather brisk in the morning, but towards noon very much flagged: on the whole it was a very good fair, the prices ranging from 37s. to 45s. 6d., and some choice cake-fed lots were sold as high as 55s. per head. The competition for the silver cup given by Messrs. Smith, Ellison, and Co. for the best pen of 50 lamb hogs, took place between Mr. Richardson, of Limber, and Mr. Davy, of Thoresway; and was awarded to the former gentleman. Some surprise was expressed at the absence of Messrs. Bemard and others, competitors for this prize; and it was stated in explanation, that the worthy bankers having increased the number of hogs in this prize from twenty to fifty, this alteration had thrown aside the exertions of the lesser farmers to compete with their more powerful neighbours. In the beast fair there was not so large a show as was expected; fresh stock, and those fit for the butcher, were readily sold, but lean cattle were not so, and prices were considered a little below those expected. The greater part changed hands. Horses of the useful cart and hackney sort were in good demand at high prices; inferior ones could not be turned into money.

CHESTER FAIR.—Very little cheese was pitched, prices averaged about 55s. The cattle fair is scarcely worth notice. Prices of all sorts of stock were unchanged. There were several enquiries after horses, but there was little or no supply.

DEVIZES FAIR, April 20.—Beasts.—The green was pretty well covered this day with store oxen of nearly every breed, quality, and size. Trade was good for the greater number, the abundance of green feed increasing so rapidly, causes graziers to add many more to their present stock. Short-horns and moderate-sized oxen from North Wales, with the best description from Ireland, Holland, &c., found buyers at the full prices asked; large and the very small not quite so much in request. The common prices given for those from one year up to eighteen months old were from £6 up to £10 each; some large Hereford and Devons stood at £11 to £13. There were some excellent stock calves, at from four to six months old, which found no difficulty in changing masters. The quantity of first-rate cows was not so great as some years, yet the number was equal to the demand. Some splendid short-horns and Alderney cows, with a calf by side, reached £16 to £18 each; calving ditto, £15; first-rate heifers, £14; ditto, middling quality, £12 to £13; some small Jersey cows, in full milk, reached £10; small Normandy ditto, from £8 to £9. Of small calves, from three weeks up to two months, a great number; prices ran from 10s. to £3 each; many were disposed of during the morning. There were some good downs and half-bred sheep, though not so many as at former fairs held here. The best large tegs made from 45s. to 50s. each; small, 38s. to 42s.; ditto ewes, best, 40s. to 48s.; moderate ditto, 35s. to 38s.; best couples from 50s. to 60s.; others at from 44s. to 48s. There were some large strings of horses. The best warranted light gig or riding nags made top prices, a few superior three to four years old selling at from £35 to £45 each; very moderate ditto, £25 to £30; inferior, £15 to £20; ditto, under fourteen hands, from £13 to £18; well shaped ponies, £4 to £6; forest ditto, £3 to £4 each. The heavy agricultural and contractors' sorts, if of good size, strength, and symmetry, were soon disposed of, varying from £30 up to £40 each; next in quality and strength at £25; aged ditto, £18 to £20. The number of worn-out animals exceeded the usual quantity; such appeared difficult of sale. The lean pig pens were pretty well filled: best large sold well at from 20s. to 30s. each. Large sows found purchasers at good prices. Small pigs were not so much in demand, therefore prices were a trifle lower. FAT STOCK.—The short supply at Salisbury on Tuesday last, and the quick sale there caused fat oxen to go off quickly here. Some very superior fat Devons made 12s. 6d. per score; next in quality, 11s. to 11s. 6d.; very moderate beasts, selling at 10s. to 10s. 6d.; fat calves were plentiful, prices therefore unaltered, from 10s. to 11s. being the general run. Fat Sheep: best 6-tooth Wilts and Dorset downs fetched 5s. 4d. to 5s. 6d. per stone of 8lbs.; some half-bred wethers, 5s. to 5s. 2d.; 4-tooth ditto, 4s. 10d.; fat ewes, of moderate quality, 4s. 6d. Fat lambs were sold at 6s. 4d. to 6s. 8d. per stone. Best fat bacon hogs made 11s. per score; second-rate ditto, 10s. to 10s. 6d

DODBROOK FAIR was well supplied, especially with fat beasts; the attendance of buyers was large, and much business was done on lower terms than of late.

DORKING FORTNIGHTLY MARKET.—There was a very excellent show of fat stock, considering the season of the year, and very few things were driven home unsold. Beef, 4s. 2d. to 4s. 6d.; mutton, 5s. 8d.; lamb, 7s.; veal, 5s. to 5s. 4d.; pigs, 34s. to 35s.

EASTHOTLY FAIR.—There was a large attendance, and a good show of horned cattle of all descriptions, which hung heavy on hand, but few sales being effected. There were a good many more lambs penned than usual, which went off extremely heavy, prices averaging about 28s. per head; but a prime pen or two, we were informed, reached above 30s. The stock for the most part looked cut up by the sudden change of the weather, which had a most decided effect in damping the animal spirits of both biped and quadruped.

GREAT ECCLESTON FAIR. The show of calvers and gelt cows was less than usual. Those in condition were in great demand, and readily sold at increased value. Inferior animals were bad to dispose of. A fair show of calvers, for which there were plenty of customers at prices about as usual. A few Irish things were in the market, but no one looked at them.

HAY FAIR was very thinly attended, both by buyers and sellers. There was no alteration in the price of beef, but mutton realized about ½d. per lb. advance. Fresh steers were in demand; but the poorer descriptions of animals were a drug in consequence of the coldness of the weather and the little appearance of grass. The horse fair was equally thin, there being scarcely a good nag to be seen. A few good cart horses sold readily, but at a decline from the former high prices.

HEATHFIELD FAIR.—The attendance and the show of stock were quite an average, but the business done was very limited, excepting for good clear Sussex, of which there was a tolerable supply. There were a goodly number of horses, for

which very high prices were asked, but the sellers' terms were not, except in few instances, acceded to. Of the several pens of sheep, there were a few of the best which changed owners at tolerably high prices, but the inferior sold heavily.

HOWDEN FAIR.—The supply of horses of every description was less than has been witnessed at any previous spring fair. The attendance of dealers was numerous and respectable, amongst whom were some from London. Horses of a good quality were sold readily. At the cattle fair there was a great show of beasts, with a numerous attendance of buyers, and prices of lean cattle and sheep had a downward tendency.

KELSO MONTHLY MARKET.—The show of cattle was the largest we have witnessed since the last two years, and the quality has seldom been equalled. A number of buyers being in attendance, a good deal of briskness was manifested, and a fair clearance effected at a reduction of from 3d. to 6d. per per stone on the quotations of the previous month. Prices for beef ranged from 6s. to 6s. 9d., and a few of very prime quality 7s. per stone. The demand for young beasts was dull, and prices nearly the same as recent markets. The market was well stocked with cows, principally of the Ayrshire breed, for which there was a fair inquiry. Cows of this description sold at from £8 to £10, and those fit for the Edinburgh market ranged from £12 to £15. The supply of sheep, though inferior in point of numbers to March market, was still great, about one-fourth being fat sheep, and the remainder half-bred and Cheviot hogs. Fat sheep brought 7d. per lb., half- bred hogs from 27s. to 32s., and Cheviot ditto from 15s. to 22s. The following were the numbers shown—fat cattle, 346; keeping, ditto, 94; cows, 140; sheep, 1,340.

KETTERING FAIR.—There was an average number of cattle, but the trade was far from brisk. The few fat beasts went off at nearly the prices asked by the dealers. Fat sheep were easily disposed of at 4s. 8d. to 5s. 4d. per st. of 8lbs. Lean stock of every description were difficult to dispose of, there being but few buyers present.

KIDDERMINSTER FAIR.—There was a poor attendance of horses, and very few cattle and sheep, but a good attendance of buyers. Sheep fetched 8d. in the wool, and 7½d. out. Cows fetched from 6d. to 6½d., and, in some few cases, more.

KINGTON FAIR.—There was a strong muster of dealers and farmers. The show of stock was very fine and plentiful; the supply of sheep and lambs was but middling, which, we understand, is generally the case at this fair. The major part of the cattle was of a very useful description and excellent quality, and appeared, with very few exceptions, to be in prime condition. Barren cows, of rather inferior quality, were somewhat low in demand and price, but those of a better quality fetched very far prices. For steers there was a much better demand, and in most instances they fetched a good price. On the whole, the sale of stock was very good.

LOCKERBIE SHOW AND MARKET.—The show of sheep for the premiums was not very great in point of numbers, but excellent in quality. The premiums were awarded as follows:—Best 20 cross-bred hogs, Mr. Bell Irving, Whitehill; best 20 do. of second lambs, Mr. Marchbank, Woodfoot; second best do., Mr. Dobie, Beckton; best 20 Cheviot hogs, Mr. John Rogerson, Greigsland; best 50 Cheviot ewe lambs for sale, Mr. Laurie, Tinwald; best short-horn bullock, calved after 1st January, 1845, Mr. Elliot, Hardgrave; two best Galloway bullocks, same age, Mr. Stewart, Hillside; second best do., Mr. Hope Johnstone, Raehills; best Galloway heifer, same age, Mr. Graham, of Shaw; best beast above three years old, Mr. Elliot, Hardgrave—short-horned bullock; best 10 three-year-old Galloway stots, wintered as stores, Mr. Armstrong, Hole-meadow. The number of sheep shown for sale was beyond that of any former year, there being upwards of 5,300 on the field, and about 170 cattle. The sale of sheep was slow, and although a good many sales were effected numbers were unsold. We notice a very few of the rates: One of the lots of second hogs, 117lbs. weight, was sold at 10s.; a lot of very good Cheviot wedder hogs at 29s.—nearly the best in the market. The high price of 45s. was said to be offered and refused for above 100 cross-bred hogs. These were, however, extreme rates—30s. to 33s. were the prices of ordinary good cross-bred hogs, and 20s. to 24s. Cheviot. Several salesmen from Glasgow attended, and bought fat cattle, to go by railway, and also Carlisle butchers. One or two of the prime Galloway stots gave £23 to £25, and the heifers about £19. Much larger prices were offered for some of the short-horns; and several Galloway cows and cross-bred cattle were sold at about £20. These prices, excepting for the Galloway heifers, were all rather under than over 6d. per lb.

LONGRIDGE FAIR.—There was an average number of calving cows shown, and most of them were of superior quality: sales were made with difficulty, A large show of gelt cattle, but mean in quality; good ones were quickly bought up. A great many young things, but bad to dispose of, and prices rather lower. A few Irish ewes and lambs were offered, and soon changed hands.

LUDLOW FAIR.—Mutton in the wool sold at from 7½d. to 8d. per lb. Ewes and lambs fetched from 20s. to 45s. per couple. Store sheep were about the same. A large number of pigs were on sale, and those sold were at about the same prices obtained at other fairs recently held. The supply of beef was not by any means scanty, and realised from 6d. to 6½d. per lb. Fresh barrens, and meaty animals of any description, were eagerly purchased, and so were good cows and calves; but those of an inferior quality, of which there was a very abundant supply, were slow in demand, at rather reduced prices. In the horse fair there was a great number of horses, and carters sold very high; but those of the nag kind appeared to meet with a dull sale.

NOTTINGHAM FAIR was not well attended with buyers, and shewed very little stock, and that principally store. Anything fresh sold rapidly.

PONTEFRACT FAIR.—The show of cattle was limited a to the number offered for sale, and quite inferior as to quality: good ones were readily sold at remunerating prices; other sorts found some difficulty in obtaining customers, at the prices which the holders required. At the horse fair anything good and useful were readily sold at high rates.

RUGBY CHEESE FAIR, on Tuesday last, was not so well supplied as on former occasions; the sale, however, was brisk. Best dairies made 60s. per cwt.

SKIPTON FORTNIGHT FAIR.—The show of beef was both too numerous and too heavy for the purchasers, who were here from all parts. As a natural consequence, the market was actually dull, more visibly animated by a process of cheapening than purchasing; this was done at variable prices, according to quality, from 5d. to 6d. per lb. Calvers overstocked the demand. Sales were heavy at lower rates, without effecting a clearance. An extensive trade is going on for store cattle at rather higher rates, particularly for stirks, &c. Young heifers are scarce, and enormously high in comparison with all other kinds of stock. The trade in Irish cattle has again commenced in numerous lots, which are met with indifference, and few sales were made even at low remunerating rates, except for about one hundred in prime condition, which were early bought up.

STAMFORD FAIR.—There was not a large show of stock. Of store beasts there was a middling supply; sales were not readily effected. Very few fat animals were exhibited; those sold fetched good prices. Of sheep there was a good number penned, but the sale was dull; lambs ranged from 30s. to 40s. each.

WIMBORNE (DORSET) FAIR.—The best store oxen, steers, heifers, cows, and calves sold at good prices. Small compact Welsh cattle found ready sale, at from £5 to £7 each. Some first-rate cows, from £15 to £18 each. Heifers, from £12 to £14. Calves, from 15s. to £4. There were some pens of Downs and Dorset large sheep, which were soon disposed of at high figures. Couples, at from 44s. to 55s. Wethers, 40s. to 50s. each. Moderate and barren ewes, at from 35s. to 42s. A good show of horses; best remain as high; inferior rather on the decline. Of fat cattle a fair quantity; best oxen made 11s. to 11s. 6d. per score; common, 10s. to 10s. 6d.; inferior 9s. to 9s. 6d. Best fat Down wethers, 5s. 4d. per stone; large half-bred and horns, 5s.; inferior, 4s. 6d. to 4s. 8d Lambs, at from 6s. to 7s. Calves, at from 9s. 6d. to 10s. 6d. Fat Swine, at from 10s. to 11s.

WORCESTER FAIR.—The attendance of buyers was small, in consequence of several other fairs occurring on the same day. Beef sold at from 6d. to 6½d. There was a falling off in the show of fat cows, as compared with former fairs, and they were nearly all sold. A good show of mutton, and all was sold; price, from 7d. to 7½d., and from 8d. to 8½d. in the wool. The supply of pigs was moderate, and prices somewhat lower. There was a good show of horses, and many changed hands.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF APRIL.

The unusually large amount of rain which has fallen during the last three months has interfered greatly with the working of the land, and the sowing of spring corn has been attended with more difficulty than has been the case for some years past. Even now, with May close at hand, a considerable quantity of land intended for barley remains unsown, and it is not improbable that it will eventually have to be devoted to the cultivation of some other crop. That a good deal of seed has been committed to the soil under unfavourable circumstances, is, we fear, certain; indeed, the heavy clay soils have at no period of the spring been in good working condition, even where drained in the best manner, and in places where this essentially necessary part of modern husbandry has not been well attended to it has been nearly impossible had to get on to the land. So much in regard to the difficulties and vexations which farmers have had to encounter in one of the most important operations of the season; and, from what we have stated on this head, it may be inferred that we are not very sanguine as to the probable result of the crops when the seed has been so indifferently got in. As a consolation for the desponding, we beg, however, to remind them of 1844, when, from the opposite cause, namely, the want of rain, the sowing of barley was delayed till late in May, and every one predicted a very bad crop; but June proving very auspicious, the seed vegetated well, and the barley harvest was nearly as early and as productive as if the sowing had been accomplished at the usual period. We have great faith in the power of favourable weather, and believe that if May should prove tolerably propitious, everything would be set right. The most important point appears to us to be the effect which a wet spring may have had on the wheat plant, and we have consequently been particular in our inquiries and researches as to the aspect of that crop. From what has come under our own observation, as well as from what we learn from correspondents in different parts of the kingdom, we have reason to believe that more or less mischief has been done; but, as the breadth of wheat sown was great, and the plant generally thick on the ground, partial injury, such as that hitherto sustained, might, we think, be easily recovered, if the summer months should happily prove favourable. The few very hot days experienced in the early part of the month seem to have done more harm than the rain: the change of temperature was too sudden, and the plant ran up spindly; this, and the somewhat yellow, unhealthy colour of the blade, are the principal subjects of complaint at present, and it is, besides, feared that the mild character of the winter, and the prevalence of mild, damp weather since, may cause an unusual abundance of slugs and other insects; hence, to say the least, the prospects are certainly not very cheering. This state of things would, in former years, have given rise to speculation in breadstuffs, but hitherto all has remained quiet, which we are disposed to attribute to the want of capital in the trade, the losses of last year having ruined many of the merchants engaged in this branch of business. Whether prices will advance, depends, in our opinion, principally on the weather. Should the summer and autumn prove fine (which is certainly not improbable, after so long a spell of wet), the slight uneasiness now felt would be speedily forgotten; all parties would begin to talk of an early and good harvest; and if in the interval the political state of Europe should become somewhat more settled, so as to allow business to flow into its accustomed channels, we should probably receive large supplies from abroad, and under such circumstances, moderate as prices now are, they would be very likely to be further depreciated. At present, however, it must be allowed that the aspect of affairs is more in favour of a rise than a decline. The weather still continues very unsettled, the reports from the agricultural districts become daily more unfavourable, whilst the continent of Europe is in so disturbed a position as to render a war between some of the great powers an event by no means improbable.

The stoppage of the passage of the Sound would of course cut off supplies from the Baltic; and as that is almost the only quarter where prices are sufficiently moderate to leave a margin for profit on shipments to this country, the chances of such an occurrence as a blockade by the Danes ought not to be altogether overlooked when the question of future supplies is under consideration.

The uncertain position of affairs has not hitherto had the effect of checking supplies from abroad; and the receipts have, during the month, been on rather a liberal scale. Meanwhile, there has been

no disposition on the part of the merchants, millers, and dealers to purchase beyond what they have required for immediate wants; and though the tendency of prices has, on the whole, been upwards, the rise has hitherto been but trifling. As the character of the trade at the leading provincial markets has, as usual, been regulated in a great measure by the transactions at Mark Lane, we shall confine our remarks more particularly to the occurrences at the latter place.

The arrivals of wheat coastwise, into London, have at no period of the month been by any means large, which may, however, be easily accounted for; firstly, by the fact that farmers have been on the alert to take advantage of every favourable moment to finish the sowing of the spring crops; and further, by the state of the weather, which has been very unauspicious for thrashing. The quantity of wheat brought forward by land-carriage samples, from the home counties, has, owing to the same causes, been very moderate; and to the smallness of the receipts, more than to any activity in the demand, the slight advance established is to be attributed. The millers have, in fact, acted with more than ordinary caution, and have manifested a decided unwillingness to add to their stocks. During the first half of April quotations remained perfectly stationary; and though the receipts coastwise scarcely amounted to 4,000 qrs. per week, the supply proved fully equal to the demand, part of the Monday's arrival generally remaining unsold on the subsequent Friday. On the 17th instant a firmer tone began to be assumed by factors, and some little uneasiness having by that time been caused by the continued rain, buyers came forward rather more freely. It was, however, only on the best qualities that they were disposed to pay any advance, and the rise of 1s. per qr. realized in partial instances did not extend to the ordinary runs. The following Monday (24th April), an attempt was made to establish a further rise, but the millers were (as had been the case on every previous occasion) but little inclined to buy, still the finer descriptions were placed at prices about 1s. per qr. above those current on that day week. The advance would probably have been more important had it not been for the abundance of new foreign wheat on the market, which had the effect of rendering buyers independent of the home supply, There can be no doubt that this circumstance has had considerable influence in checking the upward movement, the arrivals from abroad having amounted weekly to nearly 20,000 qrs., comprising a fair proportion of new many of the cargoes from the Baltic of excellent quality, and some parcels from Holland and Brabant by no means bad. Our millers have, consequently, experienced no difficulty in obtaining quality as well as quantity; for though the importers of foreign have refrained from pressing sales, they have shown themselves ready to accept any reasonable offer rather than incur the expense of landings. The country inquiry has been comparatively trifling, and as the local demand has not been sufficiently extensive to take off the whole of the supply, the stocks in granary have rather accumulated. In prices very little variation has occurred, for notwithstanding the somewhat firm tone of the trade in English, buyers have in most cases resisted any attempt on the part of holders of foreign to establish an advance, and quotations are at present very nearly the same as they were at the close of last month. Of really fine high-mixed Danzig there is none on the market, and the exact value cannot therefore be given; good high and fine mixed may be quoted from 54s. to 56s., and inferior sorts from 48s. to 52s. per qr. The business done has, however, been principally in red, of which the bulk of the supply has consisted. The quality of the shipments from Hamburgh has varied a good deal, and there has been a difference in the prices realized for parcels from that port of several shillings per qr.; the common sorts have sold at about 50s., whilst some of the best heavy samples have made 52s. to 53s. per qr. Rostock wheat has, as usual, had a decided preference, and for the best shipments from thence fully as much has been paid as could have been realized for high-mixed Danzig. The prices quoted are of course duty-paid; there is so little prospect of any reduction occurring in the duty, that no one is inclined to speculate on such an event; hence nothing has been done in wheat under lock.

There has, throughout the month, been a good consumptive demand for flour, and the top price of town-made has been well maintained. Of country manufactured flour we have received good supplies coastwise and by railway, and the quantity on the wharfs and in warehouse has rather increased. Really good sound marks have, nevertheless, been held firmly at the terms current about the end of last month, and so little concession has been made on even doubtful qualities that we do not deem it necessary to alter quotations. Having received no fresh supplies of flour from America worth naming, the stock at this port has been further reduced, and good brands have now become very scarce. Choice samples have sold in retail at 27s. per barrel, but the prices paid for sour and otherwise unsound sorts have varied greatly.

The market has been very sparingly supplied with barley, and though the advanced period of the season has reduced many of the principal maltsters to leave off working, still the inquiry has

been sufficiently active to cause the previous value of this grain to be firmly supported; indeed, on the whole, the tendency of prices has been rather upwards; the best descriptions could certainly not be bought at present below 35s. per qr., which was an extreme rate at the close of March. Distillers' barley has also been in fair request, and has brought full prices, bnt the demand for grinding sorts has been slow, owing, no doubt, to the low prices of many articles suitable for feeding, such, for instance, as Indian corn and meal. Turkish, and other inferior sorts of barley, have been nearly unsaleable, and even the lighter sorts from the Baltic have been very difficult of disposal.

The inquiry for malt has not been so lively as it was in March, still sellers have maintained a firm tone, and the operations entered into, though on a decidedly retail scale, have been at prices quite equal to those previously realized.

The arrivals of oats from our own coast and Scotland have been small, but from Ireland rather an increased quantity has come to hand, which, with good receipts from the near continental ports, has prevented anything like scarcity being felt. During the first half of the month, the principal dealers refused to buy, except at reduced rates, and as factors were not disposed to make further concessions, very little business was done until about the 17th inst. The wants of buyers had probably by that time become somewhat urgent, still they confined their operations to quite a narrow circle, and the utmost that sellers were enabled to do was to obtain an advance of 6d. per qr. on the very finest corn. Even this trifling improvement was scarcely maintained during the subsequent week, and prices are now scarcely so high as they were when we last addressed our readers. Capital feed may now be had at 21s. to 22s. per qr., and potato oats on equally moderate terms. Some of the inferior Irish and foreign oats have been offered very low without exciting attention, and on the whole there is not much prospect of any immediate advance in the value of this grain.

Quatations of English beans have scarcely varied since our last; the quantity brought forward at Mark-lane has been small, but the requirements of the trade having been on the same limited scale, there has been neither rise nor fall deserving notice in prices. Egyptian Beans have, on the other hand, fluctuated materially. Owing to large arrivals both here and at outports, the price was at one period reduced to 22s. per qr.: this brought forward some speculative buyers, and on the 24th inst. few sellers were disposed to accept below 24s. to 25s. per qr. for good qualities.

The operations in peas have been of very little interest, and quotations are very nearly the same now as they were a month ago: 35s. to 36s. per qr may be considered the utmost that can be made for white boilers, and other sorts may be obtained at corresponding rates.

Indian corn has met with a moderate share of attention for cattle feeding, owing to its relatively low value as compared with other articles, good 60lbs. white corn having been sold at 27s. to 28s. per qr. Besides the local consumptive demand, there has been some enquiry on Irish account, and a few parcels have, we believe, been purchased for the sister isle. The only change which has occurred in the duties since our last has been a reduction of 6d. per qr. on barley; and the other articles, the duty on which is regulated by the barley average, viz., rye, beans, and peas, which together with the first named grain, are at present admissible at 2s. per qr.

With the exception of some of the northern ports of Europe, where prices have lately given way, quotations of wheat are still too high abroad to render a profitable import business probable. At the leading markets of the United States, the value of bread stuffs had, according to the most recent advices, been well maintained; indeed, the tendency had been upwards, notwithstanding the discouraging reports from Great Britain. Meanwhile, there was hardly anything being done for export; and we are disposed to think that, later in the season, when the spring supplies from the interior shall have reached the sea-board, that sellers will have to give way; for there can be little doubt that the last crop was a very productive one, both in the United States and in Canada. We greatly question whether the home demand will, if unassisted by an export inquiry, suffice to support prices. Good brands of Genessee flour was, in the beginning of the month, when the Caledonia left New York, still worth 6½ d. per barrel, being rather more than the same quality would sell for in the London market. At Philadelphia, Baltimore, &c., prices were equally high, with comparatively little business doing. A few shipments of Indian-corn were still being made, from time to time, to British ports; and supplies of that article are not likely, therefore, to fall off much.

From the Baltic, the letters are principally taken up with the consideration of the question of peace or war, and the fear that the hostilities between Denmark and Holstein may ultimately lead to differences between the greater powers had, to a certain extent, rendered both buyers and sellers indisposed to enter into transactions involving any risk of voyage. The little corn which had been bought at the lower ports, on English account, was waiting for British vessels to be sent out; it being considered very hazardous to ship under any other

flag. Most of the markets had been but indifferently supplied by the farmers; notwithstanding which, prices had receded.

The most recently received accounts from Danzig are of the 15th April. Good new wheat, weighing 60 lbs. per bushel, was then obtainable at 36s. per qr., free on board; and inferior sorts, of 58 lbs. weight, had been offered at 33s. to 34s. per qr. Of really fine high mixed qualities, none had come forward.

The advices from Stettin, Rostock, Wismar, &c., inform us that business had been all but brought to a stand, in consequence of the political position of affairs; and it is probable that positive orders, limited even as low as 35s. to 36s. per qr., would be executed at the ports named.

At Hamburgh, wheat had, after having been in lively request, again become dull of sale. Very fine Upland, weighing 63 lbs. per bushel, had been sold there, at 36s. per qr. free on board.

In the Dutch and Belgium markets, prices are about on a level with our own, and there is consequently little prospect of exports from thence to this country, or shipments from England to the Netherlands.

The advices from the Mediterranean are wholly without interest in a commercial point of view, business having been brought to a stand by political events. The latest quotations for Polish Odessa wheat, from Marseilles, Leghorn, &c., was about 36s. to 38s. per qr. free on board. A purchase or two of Indian-corn had, it appears, been made at Trieste (quality very fine) at 18s. 6d. per qr. free on board, and a vessel chartered to load to a port in the United Kingdom, at 6s. per qr., 10 per cent. and 10 guineas.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter. NEW.		OLD.	
WHEAT, Essex and Kent, white	46 to 57		49 to 58	
Ditto red	45	51	46	55
Norfolk and Suffolk	46	49	—	—
Lincolnshire and Yorkshire	—	—	45	52
RYE	32	34	—	—
BARLEY .. Essex, com. Malting	33	36	—	—
Kent, Norfolk, Distillers' & Grinding	30	33	—	—
and Suffolk .. Chevalier	34	36	—	—
MALT .. Essex, Norfolk and Suffolk	—	—	55	57
Kingston, Ware, and town made	—	—	57	59
OATS .. Norfolk, Cambridgeshire, Lincolnshire, and Yorkshire, feed	—	—	17	20
Ditto, Poland and potato	—	—	20	23
Northumb., Berwick, & Scotch potato	—	—	22	25
Ditto, feed	—	—	20	22
Devon & West Country, feed or black	—	—	15	18
Dundalk, Newry, and Belfast, potato	—	—	20	22
Ditto, feed	—	—	18	21
Limerick, Sligo, and Westport, potato	—	—	19	22
Ditto, feed	—	—	18	21
Cork, Waterford, Dublin, Youghal, and Clonmel, black	—	—	14	18
Ditto, white	—	—	16	20
Galway	—	—	12	14
BEANS .. Ticks	31	33	38	40
Harrow and small	34	37	40	50
PEAS .. Boiling	33	36	—	—
Hog and grey	32	35	—	—
FLOUR .. Town made (per sack of 280 lbs.)	—	—	41	46
Norfolk and Suffolk, household (do.)	—	—	35	38

FOREIGN GRAIN.

	Shillings per Quarter. FREE.
WHEAT .. Dantzic and Konigsberg, finest high mixed white	53 to 58
Ditto, good mixed	52 53
Ditto, red mixed	47 49
Stettin and Rostock	53 55
Danish	47 51
Hamburgh and Pomeranian	49 51
Black Sea (nominal) hard to soft	40 44
Riga, St. Petersburgh, and Liebau, soft	34 42
Canada	49 51
Spanish	54 57
Buck or Brank	34 36
INDIAN CORN	25 30
BARLEY .. Hamburgh, Dantzic, Konigsberg, and Riga	27 30
Ditto, Grinding	26 29
Danish, Mecklenberg, and Pomeranian	25 30
OATS .. Dutch, brew, & Poland, Friesland, & Groningen	21 23
Danish and Swedish	16 21
Russian	17 20
BEANS .. Tick	32 35
Small	40 42
Mediterranean	24 26
PEAS .. White boiling	32 35
TARES (none)	— —
FLOUR .. United States	22 27
Canadian	22 26
INDIAN CORN MEAL (per brl. of 196 lbs.)	11s. 6d. to 12s.
RYE FLOUR (per ton)	£6 0s. to £6 10s.

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans. s.	d.	Peas. s.	d.
Mar. 11, 1848..	50	2	30	4	20	2	33	4	36	2	39	0
Mar. 18, 1848..	50	4	30	5	20	4	28	6	36	2	39	10
Mar. 25, 1848..	51	4	30	11	20	4	30	4	35	5	38	2
Apr. 1, 1848..	51	10	31	5	20	2	29	8	35	7	36	4
Apr. 8, 1848..	51	6	32	2	19	7	29	6	35	3	38	3
Apr. 15, 1848..	49	7	32	2	19	11	28	10	35	6	36	11
Aggregate Average of the six weeks which regulates duty	50	9	31	3	20	1	30	0	35	8	38	1
Comparative Average same time last year	75	5	50	11	31	4	56	1	51	5	55	8
DUTIES	7	0	2	0	2	6	2	0	2	0	2	0

PRICES OF SEEDS.

Seeds quite neglected, and quotations nominal.

BRITISH SEEDS.

Cloverseed, red 33s. to 48s.; fine, 51s. to 52s.; white, 38s. to 48s.
Cow Grass ..... 36s. to 58s.
Linseed (per qr.) .. sowing 56s. to 60s.; crushing 42s. to 48s.
Linseed Cakes (per 1,000 of 3 lbs. each) £12 10s. to £13 0s.
Trefoil (per cwt.) ..... 15s. to 21s.
Rapeseed, new (per last) ..... £30 to £34
Ditto Cake (per ton) ..... £5 15s. to £6
Mustard (per bushel) white .... 6s. to 9s.; brown, 8s. to 10s.
Canary (per qr.) ..... 67s. to 68s.; fine, 69s. to 70s.
Tares, Spring, per bush. ..... 5s. 6d. to 6s. 6d.

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. .... 33s. to 43s.
Ditto, white (duty 5s. per cwt.) per cwt......... 36s. to 52s.
Linseed (per qr.) .. Baltic 42s. to 46s.; Odessa, 42s. to 46s.
Linseed Cake (per ton)........................ £8 to £9
Rape Cake (per ton) ....£5 to £5 10s.
Carraway (per cwt.) .... 35s. to 37s.; new, 37s. to 38s.
Coriander (per cwt.) .... 16s. to 20s.
Hempseed (per qr.)........................... 35s. to 38s.

POTATO MARKET.

SOUTHWARK WATERSIDE, April 24.

Notwithstanding the very favourable weather for the consumption of potatoes, our trade is heavy, and it is with difficulty the following prices are realized :—

	s.		s.		s.		s.
York Regents	140	to	150	Essex Shaws	90	to	100
Do. Shaws	90	to	100	Do. Kidneys	130	to	140
Wisbech Regents ..	110	to	130	Do. Blues	120	to	130
Do. Blues	80	to	85	Belgian Whites	85	to	95
Scotch Whites	90	to	95	Hamburgh do.	85	to	90
Essex Regents	120	to	140				

POTATOES.—MANCHESTER, Thursday, April 20 : Potatoes, 11s. to 16s. 6d. per 252lb.—STOCKPORT, Thursday, April 20 : Potatoes, 13s. to 17s. 6d.—LIVERPOOL, Thursday, April 20 : Potatoes, Kemps, 6s. 2d. to 6s. 5d.; ditto, pink eyes, 6s. 2d. to 6s. 6d.; ditto, cups, 6s. to 6s. 4d. per bushel.

HOP MARKET.

BOROUGH, MONDAY, April 24.

We have but a small amount of business doing, at the rates of this day week. The long continuance of wet weather is beginning to excite apprehensions as to its effect upon the growing plant.

HORTON AND HART.

LEWES, April 18.—There is nothing new to report in the hop market; sales range from 56s. to 65s. per cwt.

BUTTER, CHEESE, BACON, AND HAMS.

Butter, per cwt.	s.	s.	Cheese, per cwt.	s.	s.
Dorset	108 to	112	Double Gloucester	60 to	66
Carlow........	94	—	Single	58	64
Sligo	84	—	Cheshire	56	74
Cork, 1st......	88	94	Derby	62	66
Waterford.....	84	—	American......	48	52
Limerick	86	—	Edam and Gouda	46	50
Foreign, prime			Bacon, new	64	70
Friesland....	106	—	Middle........	46	60
Kiel........	94	102	Hams, Irish......	66	70
Fresh Butter, per doz.,			Westmoreland..	78	—
12s. 6d. to 14s. 0d.			York.	84	—

WOOL MARKETS.

BRITISH WOOL.

LEEDS, April 22.—We have not any alteration to quote in this branch of trade. Sales this week have been very trifling, and prices are nominal.

LIVERPOOL, April 22.

SCOTCH.—There is still a moderate demand from the trade for laid Highland wool at late rates. White Highland, of a good length of staple, commands a readier sale. There has been more doing in both crossed and Cheviot wool at barely late rates.

		s.	d.		s.	d.
Laid Highland Wool, per 24lbs.....		5	6	to	6	3
White Highland do.................		8	3		9	0
Laid Crossed	do .. unwashed....	7	6		9	6
Do.	do... washed	8	0		10	0
Do. Cheviot	do... unwashed	8	0		10	0
Do.	do... washed	12	0		16	0
White do.	do.................	18	0		20	0

FOREIGN.—There was a public sale of about 300 bales of East India wool on the 19th instant; the attendance was fair; the better classes barely supported former rates; the middling and lower were well supported, otherwise the business by private contract is very trifling.

LEEDS, April 20.—Sales to a considerable extent have been effected during the last few days, both in German and colonial Wools, to supply the immediate requirements of the manufacturers.

HIDE AND SKIN MARKETS.

			s.	d.		s.	d.	
Market Hides,	56 to	64lbs.......	0	1½	to	0	1¾	per lb.
Do.	64	72lbs.......	0	2		0	2¼	„
Do.	72	80lbs.......	0	2½		0	2¾	„
Do.	80	88lbs.......	0	2¾		0	3	„
Do.	88	96lbs.......	0	3½		0	3¾	„
Do.	96	104lbs.......	0	3½		0	4	„
Calf Skins			4	6		5	6	each.
Horse Hides			8	6		0	0	„
Polled sheep................			3	4		4	6	„
Kents and Halfbreds....			3	8		4	8	„
Downs......................			2	9		3	6	„
Shearlings			0	4		0	6	„
Lamb Skins			1	4		2	6	„

BARK.

Per load of 45 cwt.

	£	s.	d.		£	s.	d.
English, Tree...............	£11	0	0	to	£12	0	0
Coppice	12	0	0		13	0	0

LIVERPOOL (DUTY FREE)—Quercitron, 8*l*.6s. to 9*l*. 6s.; Dutch Oak, per ton, 4*l*. to 5*l*.; German, 3*l*. 10s. to 6*l*.

PRICES OF MANURES.

Subjoined are the present prices of several sorts of Manure :—

Agricultural Salt, 30s. per ton
Alkalies, 28s. and 42s. per cwt.
Boast and Co.'s (Bow) Inorganic Manures, from 6s. to 11s. per cwt., according to crop
Boast's Guano, 9*l*. 9s. per ton
Carbon, 12s. per qr.
Chie fou, 21s. per cwt.
Chloride Lime, 28s. per cwt.
Clarke's Compost, 3*l*. 12s. 6d. per hhd., sufficient for three acres
Fothergill's Gypsum, 35s. per ton.
Fothergill's Phosphate of Lime, 8*l*. 10s. per ton
Graves, 6*l*. 10s. per ton
Guano, Peruvian, 9*l*. 9s.; Bolivian, 9*l*. 9s.; African, 6*l*. 6s. to 7*l*.10s. per ton, according to analysis and quantity
Gypsum, 30s. per ton
Highly Concentrated Manure, 30s. per qr.
Humus, 14s. per qr.
Bone-dust, 18s. 6d. per qr.
Half-inch Bone, 17s. 6d. per qr.
Hunt's Stuff Graves, 3s.6d. cwt.
Hunt's new Fertilizer, 13s. 4d. per qr.
J. T. Hunt's Artificial Guano, 9*l*. per ton
Manure Powder, 16s. per qr.
Muriate of Lime, 6s. per cwt.
Muriate of Ammonia, 25s. per cwt.
New Bristol Manure, 8s. per qr.
Nesbitt's Manures (prepared by the London Manure Company) 8*l*. to 14*l*. per ton, according to crop
Nitrate of Soda, 14*l*. 10s. to 15*l*. per ton
Nitrate Potash (saltpetre), 26*l*. to 28*l*. per ton.
Patent Disinfected Manure, 9*l*. per ton
Petre Salt, 2*l*. per ton
Potter's Guano, 9*l*. per ton
Preparation for Turnip Fly 10s. 6d. per pakt. sufficient for three acres
Rags, 4*l*. to 4*l*. 10s. per ton
Rape Cake, 6*l*. per ton
Rape Dust, 6*l*. 6s. per ton
Soap Ashes, 10s. per ton
Soda Ash, 12s. per cwt.
Spence and Co.'s Urated Bone Manure, 8*l*. per ton
Sulphate Soda, 6s. per cwt.
Sulphur for Destroying Worm on Turnips, 12s. per cwt.
Sulphuric Acid, 1½d. per lb.
Superphosphate of Lime, 7s. 6d. per cwt.; 7*l*. per ton
The Liverpool Abattoir Company's Animalized Manuring Powder, 2*l*. 10s. per ton
The Urate of the London Manure Company, 4*l*.4s. per ton
Willey Dust, 4*l*. 4s. per ton
Wolverhampton Compost (Alexander's), 12s. per qr., subject to carriage to London, or forwarded from Wolverhampton

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PLATE I.

The animals represented in this plate are Two Shearling Leicester Rams, the property of Mr. T. E. Pawlett, of Beeston, near Biggleswade, to which the first Prize of £40 and the second Prize of £15 in the first class were awarded at the Show of the Royal Agricultural Society, which was held at Northampton, in July last. Mr. Pawlett obtained prizes at the Society's Shows at Cambridge, in 1840; at Derby, in 1843; at Southampton, in 1844; at Shewsbury, in 1845; and at Newcastle, in 1846.

PLATE II.

JACK TAR.

ENGRAVED BY J. MOOR, FROM A PAINTING BY W. H. DAVIS.

(For description see page 489.*)*

TULL'S SYSTEM OF HUSBANDRY.

BY J. TOWERS, MEMBER R.A.S., H.S. OF LONDON, &c.

I offer no apology for the re-introduction of this subject, since Mr. Hewitt Davis has come forward with so much candour in a recent article which has appeared in the *Agricultural Gazette* of May the 18th. It is right that justice be rendered to every one. This Mr. Davis felt; and he has seized a most happy point whereat to revive the memory of a great man—a thorough reformer of agricultural principles. As he has so handsomely paved the way of advance, I shall, after extracting a line or two from his article, endeavour to make the reader acquainted with the theory of Tull, which failed merely because chemistry was then far in arrears, and *he* lived in advance of the period.

"The agricultural public," says Mr. Davis, "have so long coupled my name with 'thin sowing,' that I confess I have taken credit for having, as I fancied, introduced a new improvement of the first consequence in farming; but as I was beginning to feel myself at home to the honours, the work of Jethro Tull has come into my hands, and the gayest feathers of my wings I find to be the property of an agriculturist who died ere my grandfather was born."

Some twenty-five years since, or more, the late William Cobbett took up the cause of Tull. He even published his work; and, as I well remember, recurred again and again, in his weekly *Political Register*, to the principles and practice therein advocated. Referring to an able and impartial biography in the "Cyclopædia" of the late Society for the Diffusion of Useful Knowledge, I am enabled to communicate some leading facts which ought to be before the public, and can *now* be appreciated.

"Jethro Tull, a gentleman of moderate fortune possessed a small estate near Hungerford, in Berkshire. He has generally been considered as the

father of the drill and horse-hoeing husbandry. Having observed the good effects of the cultivation of many plants in regular rows, and of frequently stirring the intervals between them, he attempted to introduce this system into the field, and invented many ingenious implements for diminishing the labour of hand-drilling and hoeing. The success which attended his first experiments on a good *deep loam* confirmed his expectations, and led him to a theory which was the cause of his own ruin, and threw discredit on his whole system, which in other respects was founded on sound principles.

"Observing that, by means of assiduous cultivation, and stirring of the soil around the roots of growing plants, he produced a greater luxuriance of growth than by the common methods, without any addition of manure for several years, he concluded rashly that the earth, very finely divided, together with moisture, constituted the whole of the food of plants, and that, consequently, stirring and pulverizing the soil was a complete substitute for manure.

"Tull published a treatise on his new mode of cultivation in 1731, in which his principles were explained, and calculations made, founded on his early experiments, of the immense profit which would accrue in the course of years by adopting his practice. Change of crop would be no longer necessary; rotations useless; the most profitable crops could be raised year after year without diminution; and the soil be kept in a state of perpetual fertility. Such were the visions of a man of abilities, led into error by his own sanguine imagination. Had the soil of Tull's farm been of a poor gravelly or sandy nature, he would soon have discovered his error by a few experiments; but working on a good loam, and continually keeping it stirred and pulverized, it required a much longer time to exhaust it."

When Tull wrote and practised, 130 years since, and during a full century subsequent, little or nothing was thought of the terrene alkalies and phosphates. Within the twelve last years a good many discoveries have been made concerning the so-called *in*organic elements. Tull's theory, instead of being still more repudiated, has acquired strength and validity, in so far as it has been proved that, by deep digging and subsoil disturbances, the alkaline silicates are raised and exposed to the decomposing agencies of air, lime in the soil, and vital radical attraction. Hence, however we may be assured that generous additions of putrescent manures are indispensably required as restoratives, it cannot be doubted that the *in*organic salts are brought into play by the divellent powers alluded to.

"In 1822 the late Mr. Cobbett edited a new edition of Tull's works, with an introduction by himself, which is full of useful remarks. Cobbett fully appreciated the practical part of Tull's system, and strongly recommended it in his 'Cottage Economy.' He showed there, by actual experiments in the garden, how greatly the stirring of the soil about the roots of growing plants assisted their growth, and the advantage of allowing a certain space to every plant to admit of this stirring."

Mr. Davis's recent paper helps us to some of these experiments. Thus, in 1813, "he" (Cobbett) "sowed 13 rods (poles) of land with wheat, in Tull's system—namely, three ridges, a single row on a ridge, and the ridges three feet apart, against other 13 rods sown broadcast. The Tullian yielded 2 bush. 5¾ galls.; the broadcast, 2 bush. 7½ galls.; the first being at the rate of 33 bush. 6 galls. per acre, the latter at the rate of 36 bush. 0½ gall. to the acre. The broadcast was sown at the rate of 3 bush. per acre, the Tullian at 5 galls.; and, *deducting the seed sown*, the result shows an increase of 0½ gall. in the acre in favour of the latter."

Another experiment by Cobbett consisted in "taking 10 feet of one of the rows, and thinning out the plants so as to leave only 12 in a foot. The produce of these 10 feet gave a wine-glass more of wheat than where the row was not thinned out. This thinned wheat would require no more than 1¾ gall. of seed per acre; and, moreover, it was spring wheat."

Recurring to our biography: "Tull had cultivated roots with great success according to his system; and as long as the organic matter in the soil was not exhausted, the success fully proved the correctness of his practice. The greatest obstacle which Tull had to contend with was the obstinacy of his labourers, who thought him quite mad when he ordered them to sow only two rows, ten inches apart, on a stitch of land four feet six inches wide, leaving 44 inches between each double row for the working of the plough. He was forced to put his hand to the plough himself; and in this, as well as in his other trials, he was greatly assisted by the encouragement and actual help of Lord Ducie of Moreton, whose descendant, the Earl of Ducie, is now one of the most zealous and active patrons of all improvements in agriculture, having established a model farm at Whitfield, in Gloucestershire, and invented several useful implements of tillage.

"Whatever may have been the errors of Tull in hastily adopting an erroneous theory, he has many excuses in the received opinions of his time. Van Helmont's experiment of the willow prepared the minds of scientific men for the theory that water alone was sufficient for all the purposes of vegetation; and Tull seems to have supposed some

pabulum in the ultimate particles of the earth, which, with water, furnishes all that the soil requires to produce active vegetation; and when we consider that, by the most recent experiments, it has been fully proved that four gases—oxygen, hydrogen, carbonic acid, and nitrogen, or azote—with a very small proportion of earth, form the whole elements of vegetable and animal substances, it is not so great an error to suppose that air, water, and earth, which contain all these elements, may be sufficient for vegetable or animal increase. *This was the whole error of Tull.*"

And was it an error in *principle?* that is the question. Five years only have elapsed since the 25th vol. of our "Cyclopædia" was printed, yet who can say what has been the sum of chemico-organic researches during that short period! The same results still present themselves, only that the *combining equivalents* of these organic elements are proved to be essentially different, the diversity being almost infinite. Tull's error, and that, I imagine, of all modern theorists, consist in the misapplication of principles. Too much is ascribed to *air*. Facts the most stubborn prove that the earth is the chief *matrix*, and the roots of plants the active organs. The decomposable substances must be buried, must be brought into complete union with the earth, and be *there* duly supplied with rain-water, otherwise vegetation must flag, let man otherwise do what he can. Were not the inorganic salts derived *originally* from *sea-water?* and hence the vast supply of alkalies in rocks and loams; hence the calcareous phosphates, which furnish the materials for the formation of animal bone. The laboration and deep tillage of the land are proved to be inevitably required, in order to reveal these hidden treasures; and therefore, so far from repudiating Tull's hypothesis, we ought to respect it as sound in principle, the restoration of those decomposable substances which the absorbent powers of plants have abstracted from the ground being all that the most efficient system of husbandry can require either in theory or practice.

MANGEL-WURZEL.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The chemical knowledge which has within the last few months been bestowed upon the examination of the English farmers' commonly cultivated root-crops is of the greatest practical interest. Such researches direct our attention, in language which can hardly be misunderstood, to the food which these roots require for their profitable growth, and to the manures which contain that food in its most available state. We can hardly recur to these researches too often; and if I confine my observations in the present paper to only one of these extensively cultivated roots—the mangel-wurzel—it is because of its being the earliest sown of these invaluable plants; and besides, it is very certain that we can hardly acquire useful information on any one of the members of this great class of field-crops without at the same time deriving some useful suggestion towards the better treatment of the other members of the same great family.

The chemical composition of the mangel-wurzel has recently been laboriously examined by Professor Way (*Jour. R. A. S.*, vol. 8, p. 199), and by Professor Johnston (*Quart. Jour.*, 1847, p. 606). The comparative proportions in which the mineral substances contained in these roots are present is thus given by the first-named of these distinguished Professors of Agricultural Chemistry:—

One ton of the bulbs of the turnip, the mangel, and the carrot contain in lbs. (being the average result of the several analyses)—

	Turnip.	Mangel.	Carrot.
Silica	0.34	0.54	0.24
Phosphoric acid	1.77	0.66	1.73
Sulphuric acid	2.33	0.65	1.31
Lime	1.76	0.41	1.77
Magnesia	0.47	0.43	0.80
Peroxide of iron	1.07	0.12	0.22
Potash	6.07	4.99	6.59
Soda	1.46	3.62	2.71
Chloride of sodium (common salt)	1.49	5.29	1.42

In the same weight of the *tops* was found—

	Turnip.	Mangel.	Carrot.
Silica	1.73	0.76	4.46
Phosphoric acid	2.60	1.94	1.64
Sulphuric acid	3.46	2.20	5.61
Lime	11.29	3.31	30.24
Magnesia	1.16	3.27	2.58
Peroxide of iron	0.72	0.52	2.36
Potash	6.08	7.86	6.64
Soda	1.12	2.52	9.67
Common salt	6.15	12.82	11.95

The average proportion of the top to the bulb in

the specimens of mangel examined were found to be—

	Bulb.	Top.
Yellow globe	85	15
Long red	88	12
	80	20

Taking, then, these data, and calculating the proposed crop of roots to be equal to 20 tons of bulbs and 4 tons of tops, then the Professor shows that these weights will require, in lbs., the following quantities of different mineral matters :—

	Turnips.	Mangel.	Carrot.
Phosphoric acid	45	21	39
Sulphuric acid	50	22	57
Lime	90	21	197
Magnesia	14	22	29
Potash	140	133	134
Soda	33	70	103
Common salt	57	160	85

If, for the sake of simplifying the inquiry, we suppose a soil devoid of all these (be it remembered) essential ingredients of those roots, then it is evident that they can only be supplied in the fertilizing substances with which the land is dressed. Let us, then, briefly examine this very interesting portion of the inquiry. On this, Professor Way tells us very fairly that the farmers, by the present favourite method of manuring with bones dissolved in sulphuric acid (and the same remark applies to all those compound manures in which the phosphate and sulphate of lime are contained), make provision for the three substances first named in the above list. Recent bones, he continues, contain, in round numbers, half their weight of phosphate of lime, which phosphate of lime consists of nearly equal weights of phosphoric acid and lime. Bones, then, contain one-fourth of their weight of phosphoric acid. To supply, therefore, the 45lbs. of phosphoric acid contained in a crop of turnips weighing 20 tons, we must not employ less than 2 cwt. of bones, leaving one-eighth of this quantity for loss. If the bones be dissolved in sulphuric acid (one-half of their weight being employed), abundance of this acid will be introduced into the soil, and the lime of the bones, although not sufficient for the crop, will perhaps be an adequate addition, considering the prevalence of this earth in most cultivated soils. A crop of mangel-wurzel will require only half the bones and acid, the same quantity of pearl-ash as turnips, and twice as much common salt and Epsom salt.

As a practical experiment upon the value of supplying to the root crop these chief chemical mineral ingredients, the Professor suggests the employment, per acre, of the following mixture :—

	Cwt.
Crushed bones	2
Sulphuric acid	1
Pearl-ash	1
Epsom salts	0½
Common salt	3

The bones should be dissolved in the acid, diluted with an equal bulk of water; and after standing some hours, the pearl-ash, Epsom salts, and common salt should be added. This compound might be mixed with ashes, and drilled with the seed, or it might (previously mixed with ashes or dry soil) be applied as a top-dressing to the crop on the appearance of the seed-leaf. In cases where farm-yard manure is applied, the pearl-ash and the Epsom salts may be omitted.

I seem, upon the whole, to incline to the use of these fertilizing salts in conjunction with a diminished proportion of farm-yard manure, whenever the mixture can be accomplished at a practicable expense, rather than the employment of either the salts or the dung separately. This view of the result of my own trials and observations is confirmed by those of Mr. Pusey, in an attempt to decide experimentally, amongst other questions, the *extent* to which farm-yard manure may be applied with corresponding benefit to the farmer—that is, using his own words (*Jour. R. A. S.*, vol. 6, p. 529) :

"What is the limit beyond which an increased quantity of dung ceases to act? Or again, whether it be better to dress with dung only, or with a combination of dung and artificial manure? In order to investigate these and other points, I applied to five acres of yellow globe beet, in the first week of April, different dressings per acre of various manures. At the end of October the roots were taken up, and the produce ascertained, by weighing the yield of half an acre, measured across the six sets of rows at one end. The following were the results obtained :—

	Tons.
The soil simple produced of cleaned roots per acre	15½
26 loads of dung	28½
13 loads	27½

"In four other experiments, to the soil manured with 13 loads per acre were added, per acre, 7 cwt. rape-dust.

	Tons.
This produced, per acre	27
14 bushels bone-dust	26
7 cwt. of rags	36
3 cwt. of guano	36

"When these manures were used without the dung, then the produce per acre was found to be—

	Tons.
From 7 cwt. of rape	20½
14 bushels of bones	20
3 cwt. of guano	20½"

This, as I have had occasion to remark not long since, in another excellent agricultural periodical, is experimentally treading in a very valuable path, little hitherto explored. In the case of the beets we note from these trials that the 13 tons per acre of manure produced nearly as heavy a crop of mangel as the dressing with 26 tons; that the bones did not produce, when added to the dung, more powerful effects; but that the rags and the guano produced an increase of nearly 10 tons per acre. In the case of the guano, may we attribute this effect to the salts of which it is composed? Does not the successful use of common salt as an addition to the composts applied to this root in some degree support such a conclusion? And again, does not the analysis of the mangel-wurzel show that common salt enters so largely into the composition of this plant, that it must be regarded as an essential ingredient of every soil on which it can be successfully cultivated? At this period the inquiry is fraught with interest; for the application of a few bushels of salt per acre to a portion of the soil on which it is grown is easy, and the cost trifling.

I feel so much impressed with the probable advantages of applying common salt to the mangel-wurzel root, in every situation where it is not already contained in sufficient abundance in the soil, that I again, in conclusion, refer to the analysis of the root (and let the farmer remember that salt is worth only about 1s. 6d. per cwt.), for the purpose of showing how clearly the result of that analysis illustrates the value of common salt to this crop as a fertilizing addition.

We find, from its analysis by Professor Way (*Jour. R. A. S.*, vol. 8, p. 185), that 100 parts of the bulbs of three varieties of the mangel-wurzel contain, of ash,

Yellow globe	1.02
Long red (specimen No. 1.)..	0.64
Ditto (specimen No. 2)	1.00

One hundred parts of these ashes contained—

	Yellow Globe.	Long Red. No. 1.	No. 2.
Silica	2.22	1.40	4.11
Phosphoric acid.....	4.49	1.65	3.11
Sulphuric acid	3.68	3.14	3.31
Carbonic acid	18.14	15.23	21.61
Lime	1.78	1.90	2.71
Magnesia	1.75	1.79	2.79
Peroxide of iron	0.74	0.52	0.56
Potash	23.34	21.68	29.05
Soda	19.08	3.13	19.05
Common salt.....	24.54	49.51	14.18

The farmer will note that the ashes of these three specimens (which were grown by the Rev. A. Huxtable, in Dorsetshire, on a mouldy soil, resting specimens Nos. 1 and 2 on chalk, and No. 3 on yellow clay) contained more than 14, 24, and 49 per cent. of common salt. The ashes of the *leaves* of the beet also were found to contain an equally large proportion. 100 parts of the ashes of the leaves of the

	Parts.
Yellow globe containing....	37.66
Long red (specimen No. 1)..	34.39
Ditto (specimen No. 2)	33.96

So that, from the mean of these three specimens, we find that one ton of the fresh bulbs of the mangel-wurzel contain of common salt 5.29lbs., and one ton of their leaves 12.82lbs. The farmer's other extensively cultivated root-crops also contain common salt in very sensible and probably equally essential proportions, although to a smaller extent than that of the mangel-wurzel. For we find ("Johnson and Shaw's Farmers' Almanac," 1848, p. 11) that there are contained of common salt, in one ton of the bulbs of the

	lbs.
Turnip	1.49
Carrot.....	1.42
Mangel-wurzel	5.29

It would seem, however, like the mangel-wurzel, the tops of the carrots and turnips contain more common salt than the bulbs; for it was found that, upon an average, one ton of the entire plant, bulbs and tops, contained of it (ibid)

	lbs.
Turnip	2.37
Carrot.....	3.53
Mangel-wurzel	6.51

The application of the salt as a *top-dressing* to a portion of the crop is a practical operation (even at this time) every way worthy of the farmer's inquiry (say at the rate of 1½ cwt. and 3 cwt. per acre). It is probable that many of my readers will remember instances in which salt, by itself or in combination with other substances, proved a powerful manure to mangel-wurzel. I could easily refer to several cases. The analysis of the root, however, pretty clearly evinces the inorganic ingredients of which the root is composed; and a very little reflection will assure the scientific farmer that there are very many soils on which this crop should be successfully cultivated, which, unaided as they commonly are, can hardly furnish these substances in sufficient abundance for the support of a remunerative growth.

ON A NEW MODE OF TRANSPLANTING THE SWEDISH TURNIP.

On the 29th of October last some interesting particulars, as to a new practice in swede-transplanting, having been submitted to a meeting of the Rhins Farmers' Club, and discussed, I was directed, as their secretary, to transmit some of the results to Professor Johnston, of the Scottish Agricultural Chemical Association, to analyze; "also, to investigate into the facts and whole circumstances, and report to a future meeting," which I now beg leave to do.

Previous to giving the analysis furnished by Professor Johnston, along with his valuable paper entitled "*Suggestions for Experiments on the Cultivation of Turnips*," I beg to preface a short account of the circumstances transmitted to that gentleman explanatory of the mode of culture and treatment attendant on the growth of the swedes referred to.

Mr. Johnstone, Larg Liddesdale, not being able to get a piece of good loamy clay ground drained and limed sufficiently early (after his entry on the 26th of May, 1847), had resolved to raise swede plants, and to transplant them when his ground was ready. He sowed his seed in a sheltered bed early in April, but could not get them transplanted before the 22nd of June. Soon after transplanting —say from twelve to twenty days—Mr. Johnstone noticed the plants showing decided symptoms to run to seed, and many actually flowering. He naturally enough thought they would do no good, and the greater portion was removed, and their places supplied with kail plants; but, accidentally, some of the turnip plants were cut in the stalk for the pigs and cows, instead of being pulled. These Mr. Johnston soon observed (in twelve or fourteen days) not only to be sprouting rapidly, but bulbing also. All the plants still unpulled and uncut he then cut over, and soon afterwards he found they had gained considerable foliage, their bulbs increasing as quickly, notwithstanding, as turnips sown alongside of them in the ordinary way. The consequence was, he was able to continue cutting for upwards of three months no less than three heavy crops of green food for his cows, from the transplanted turnip so managed. At the meeting of the Rhins club before referred to (quoting from the minutes), "Mr. Johnstone, in order fully to show the way in which the turnips had grown in the stems and leaves after being cut, brought the turnips just as they had been pulled, and laid them on the club table. We shall now describe the appearance of the plants. The stems and shaws were not luxuriant, owing to their having been cut over not long before; notwithstanding, one bulb, with the leaves, weighed 18lbs., and another 15lbs. The latter turnip was well proportioned, having been cut in the stem pretty close to the shoulder of the bulb, which caused no less than fourteen new stems to spring up in a circular form round the cut neck, the consequence of which was the growth of corresponding rootlets, as feeders, all round the base of the turnip. The 18lb. turnip had been cut higher up the stem, and did not throw out its new stems numerously and equally, or bulb gradually in the elongated globular form." The kind was of Skirving's swede, the seed being got from Mr. Hugh M'Culloch, seedsman, Stranraer.

To the statement now given I may just add that I called at Larg Liddesdale upon Mr. Johnstone, examined his turnips before described, as well as those sown by him, but not transplanted, and I saw that the sample laid before the club was a fair one from the stock growing. The transplanted portion of the field bore the heaviest crop, but the sown swedes were not put in till the 23rd of June.

Such was the substance of the case laid before Professor Johnston, along with a specimen of the transplanted roots to be analyzed. The following is that gentleman's analysis and communication in reply, with his suggestions for future practice, which are worthy of serious consideration:—

COMPOSITION OF TURNIPS FROM STRANRAER.

	Per cent.	In dried Turnip.
Water	90·95	—
Protein compounds	1·28	14·14
Sugar, gum, and fibre	7·17	79·23
Ash	0·60	6·63
	100	100

Phosphates in the ash.... 31·02 per cent.

8, Bank-street, 18th Jan., 1848.

DEAR SIR,—I have the pleasure of inclosing the results of an analysis of your Swede turnips which had been transplanted and afterwards cut over three times.

1. The first point to be noticed regarding them is, that they contained, as they arrived in Edinburgh, nearly 91 per cent. of water, leaving only 9 per cent. of dry matter. The proportion of water usually ranges between 88 and 90 per cent., leaving 10 to 12 of dry matter. These sums, compared with nine in yours, exhibit a difference of some

practical consequence, were we certain that the whole crop contained so large a per centage of water. But as this may in reality be only accidental in the turnips you sent, it would be hasty to pronounce unfavourably of your new practice from this one result, or to infer that all turnips treated in the same way must contain as much water as these.

2. The dry matter is, however, as nutritive as that of turnips usually is. The muscle-forming ingredients amount to 1·28 per cent. in the fresh or recent turnips, and to 14 per cent. in the dried matter. In this respect it is inferior to few samples of turnips which have been examined, and is as nutritive as wheat or barley, or oats, as they are given to horses, and nearly as much so as fine oatmeal.

3. The per centage of phosphates in the ash is greater than has hitherto been found in any Scottish turnip. Whether this is in any way connected with the way in which these turnips have been raised, or is owing to some other cause, I am unable to say. It ought however, according to our present views, to exercise an influence of an important kind upon the feeding quality of this turnip, especially as regards growing animals, and is deserving, therefore, of further investigation.

I have enclosed a series of suggestions for further experiments on the method of cutting over your turnips, and have caused one of my assistants to write out at some length, and in his own words, the reasons on which these suggestions are founded. It will be for your club to consider how far it comes within the scope of their usual proceedings to circulate these suggestions among its members, and to encourage the prosecution of the experiments pointed out.

Believe me, yours very truly,

JAMES F. W. JOHNSTON.

Thomas Harkness, Esq.

SUGGESTIONS FOR EXPERIMENTS IN THE CULTIVATION OF TURNIPS.

We not unfrequently hear of the leaves of mangold wurzel and turnips being pulled as food for cattle, and some cultivators have contended that the growth of the plants was not apparently checked by this practice. But from what is generally understood to be the functions and use of leaves, it might reasonably be concluded that a plant like the turnip, whose most valuable product is the root, could not be deprived of mature and efficient leaves during the active season of growth, without retarding its progress, and thereby rendering the crop less profitable.

Many, it is to be feared, will be led to doubt the accuracy of this conclusion, who have read the history of the swedes exhibited at a recent meeting of the Rhins Farmers' Club. They had not been deprived of a few outside leaves merely, but had been cut over three times, yet the roots attained a considerable size; they were indeed said to have increased in a much greater ratio than other uncut swedes grown in the same field, but later sown.

A result so unusual, and in this case unlooked for, has naturally excited considerable attention, and many may be induced to repeat the experiment; but, as the secretary very judiciously remarked, the comparative success obtained might depend upon a variety of circumstances which it would be well to investigate before the experiment is repeated on an extensive scale.

A favourable opportunity seems now to be afforded, and which has long been wanted, of instituting a searching inquiry with a view to ascertain the precise effects of pulling or mowing the leaves of turnips. The members of the Rhins Farmers' Club manifest a laudable desire to obtain information on the subject, and possibly it may not be taken amiss to suggest how desirable it is that several of them should try a small comparative experiment next year, in order fairly to test the merits of this new system of turnip culture.

Several similar experiments, made on different farms, in the same season, and carefully attended to throughout, must, if the result should prove the same in all cases, be far more satisfactory and conclusive to most minds, than an experiment, however well managed, if made by one individual, on one farm only.

These gentlemen have proposed to themselves two main questions for solution:—

1. Can the turnip be profitably grown as a substitute for rape, &c.?

2. Will the roots of plants, frequently deprived of leaves, keep as well, and prove as nutritious, as roots grown in the usual way?

The following experiments seem to me best calculated to afford satisfactory answers to these questions, and they may probably indicate that there is some general rule or principle, by which any man may hereafter know in what respect, or under what conditions, it would be profitable or otherwise to deviate from the mode of culture usually practised.

Doubts are expressed as to what cause the comparative success of Mr. Johnstone's experiment was owing; whether to early sowing, to transplanting, or to cutting over the plants soon after flowering. To determine these points two sowings at least are required, say one in the first week of April, the other in the first week of May.

I propose that the experiment should consist of fifteen drills, in the centre of a field of Swedish

turnips. With a view to guard as much as possible against the influence of disturbing causes, the following precautions should be attended to:—

1. The land required should be manured with the same kind and quantity of manure, otherwise the difference in the results obtained might be owing to the action of the manure, and not to the difference in the modes of culture, which we desire to investigate.

2. The seed used must be from the same sample, because the seeds of different samples vary in quality and purity.

3. The drills must be at the same distance apart, and the plants at the same distance from each other in the drills, in order that they may have the same extent of pasture for their roots, and equal share of light for their leaves, which are points of considerable importance.

4. Let all the drills be thinned by one man, and as nearly as possible in the same way.

5. Keep the plants free from weeds throughout.

6. They should be equally free from the shade of trees, because the amount of sap which a plant can elaborate and store in its tissue is, all other circumstances being similar, in direct proportion to the breadth of foliage it can expose to the light; hence trees impede the growth of turnips and other plants, in their immediate neighbourhood, by intercepting the rays of light.

In the first week of April sow the three drills marked No. 1 in the summary; and at the same time sow a similar quantity of seed in a nursery bed, to raise plants for the purpose of transplanting in the last week of May, to the drills marked No. 2. Take the plants direct from the seed-bed to the drills, so that they may be as short a time as possible out of the ground. The object of these two experiments is partly to ascertain the effect of transplanting on produce, and whether premature flowering is chiefly the result of transplanting.

It may be well, however, to remark, that the evidence obtained on these points in one season only cannot be implicitly relied upon; because much will depend upon the nature of the weather. If warm showery weather should be experienced soon after transplanting, the plant may succeed well; the reverse might be the case if the weather should prove bright and dry.

Premature flowering is also induced by various causes. It may be the result of the plant remaining too long crowded in the seed-bed, or of hot sunny weather soon after planting, or of too early sowing. The last is a well-known cause of the premature blossoming of turnips; but in this case it is usual for them to flower towards autumn rather than in early summer.

To determine whether the turnips can be profitably grown as a substitute for rape, &c.—The leaves of the plants No. 1 and No. 2 are to be cut over three times; and it is desirable that each should be cut at the same time. If the plants of both attempt to blossom, cut the flower-stems of two drills of each about an inch and a-half above the crown of the root; cut the leaves of the remaining drill nearly close down.

Amongst the turnips grown by Mr. Johnstone some were cut down closer than others. When the stems were cut an inch or more high, lateral shoots were produced from the part of the stem left; but when they had been cut near the crown, latent buds, situated in the neck of the root, a little beyond the base of the stem, were observed to vegetate, and additional bundles of fibrous roots, seemingly in connection with these buds, were developed outside the original tap-root. The soil would thus seemingly be more widely searched; and as some of the finest roots or bulbs, as they are commonly called, were those of plants so treated, it was thought that the mode of cutting down the stems might exercise some influence on the amount of produce. These experiments will prove the accuracy, or otherwise, of this conjecture.

In the first week of May sow the drills No. 3, 4, and 5. No leaves are to be removed from the plant marked No. 3; they are required as a standard of comparison. Cut off all the leaves of No. 4 in the last week of July; and, at the same time, pull off the large outside leaves of the plants of No. 5, leaving the young leaves in the centre untouched.

The experiments Nos. 4 and 5 may show that a distinction should be made in the treatment of crops which are blossoming, and of those which do not show any disposition to flower. There can be little doubt that the growth of the root would be promoted by depriving turnips of their flowers: and the roots may even grow to a larger size when deprived of leaves and flowers two or three times, than if allowed to perfect their seeds at the first attempt. It may, nevertheless, be equally true, that plants which show no symptoms of blossoming cannot be divested of the whole, or even a part of their foliage, without the cultivator incurring a certain loss. The eye must not be depended upon to estimate the relative value of the produce of these experiments. All the leaves should be carefully weighed, and a portion thoroughly dried and weighed again. Keep notes of the dates when the leaves are cut, and of the weight produced by each of the three drills. It is requisite that the produce of the drill cut close in the experiment No. 1 and No. 2, should be weighed separately. The leaves should be cut from all the plants, and weighed,

when the roots are taken up. The roots must be weighed also.

As there may be some difference in the solidity and keeping properties of the roots of No. 1 and No. 2, it is desirable, in order that a just estimate may be formed of the relative value of these modes of culture, that two roots of each should be analyzed, and the specific gravity ascertained. If the quantity grown is sufficient, it would be well to further test the economical value of the roots of No. 1 and No. 3 by putting up two oxen; one to be fed on No. 1, the other on No. 3: notes to be taken of the weight of the animals at the beginning and end of the experiment, and of the weight of turnips consumed.

A quantity of these roots should also be pitted till spring, to ascertain their keeping properties.

When the experiments are finished, it will of course be an easy matter to calculate the aggregate value of the produce of leaves and roots per acre, afforded by each section; and whether, after deducting the expense of cutting and carting the leaves, any mode of culture tried is likely to be more beneficial than that of No. 3 usually practised; and if no other is so profitable, then what would be the probable loss per acre to the farmer if he were to practise any of the other methods as compared with No. 3.

With a view to illustrate or better explain the results obtained by the field experiments, I would recommend that twelve or twenty-four plants raised in April, in the seed-bed, should be divided into four equal lots, and planted in an open space in the garden. One-fourth to be allowed to grow naturally —that is, no leaves or flowers are to be taken from them for the purpose of showing the effect of seed bearing; and that transplanting alone, as was suggested, will not cause turnips which blossom to attain a large size. The second portion are to be cut over once when they show flower. Lateral flowering stems will soon after be produced. Let the plants now perfect their seeds, to ascertain by a comparison with the plants of No. 6 what is the effect of postponing the production of seeds on the growth of the roots, and if the growth of the roots is not checked as soon as the plant directs its energies to the formation of its seeds. When the plants of the third division throw up their flowering stems, strip off all the leaves. Do not afterwards suffer any other leaves to grow. It will then be seen that without leaves roots make no further progress. If the flower buds are nipped off the fourth portion as soon as perceived throughout the season, and if they are allowed to retain the whole of their foliage, the roots will probably continue to grow steadily and attain a comparatively large size; thereby showing that the beneficial effect of mowing the leaves of flowering turnips is chiefly the result of preventing the formation of seeds.

If it should prove that the turnip cannot be advantageously grown as a substitute for rape, it may be a question whether, when turnips are running prematurely to seed, it will not be more profitable to employ children to remove the flowers, than to mow the leaves as well as flowers. A comparison of the last mentioned plants, with those of No. 1 and No. 2 of the field experiments, may indicate which of the two practices is likely to be most beneficial.

If, again, there is a probability of the turnip being grown partly for the sake of its leaves, as cattle food in spring, it is a question whether it would not be more profitable to sow immediately after harvest than in April, and to sow in rows much closer than usual; the roots of every other row to be taken up as wanted after the first mowing of the leaves in spring.

Much useful information, it may be hoped, then, will be obtained from these experiments, if fairly tried. If they should do no more than prove the superiority of the mode of culture usually practised by the best farmers, they will not be made in vain, as they would save many from trying on an extensive scale a method less profitable, but which, before being submitted to the test of exact comparative experiment, seemed to offer greater advantages. They may dissuade others from persisting in practices which must tend to diminish the aggregate value of their crops. They may establish the importance of destroying the premature blossoms of turnips, by showing that crops in this condition which have hitherto been considered as almost lost, may, by this simple means, be turned to a comparatively profitable account; and they may possibly afford to most men a clearer perception of some of the more important laws of vegetable life, which can hardly be otherwise than beneficial to the cultivation of plants.

The experiments I have ventured to suggest will not cost much. They have been framed also with a view to obtain the greatest amount of information at the least expense—a point which should ever be kept in view by those who desire to further the progress of agricultural improvement.

Summary of Experiments on Turnip Culture proposed to the Members of the Rhins of Galloway Farmers' Club.

A.—FIELD EXPERIMENTS.

1. Three drills of swedes sown the first week of April, and the leaves cut over three times during the summer.

2. Three drills of swedes, sown in a seed bed the first week of April, and transplanted in the last

week of May. Leaves cut over, and otherwise managed as No. 1.

3. Three drills of swedes, sown in the first week of May. Leaves untouched.

4. Three drills sown the first week in May. Leaves cut over once, viz., in the last week of July.

5. Three drills sown the first week of May. The large outside leaves pulled off the last week in July, the young leaves in the centre left growing.

B.—GARDEN EXPERIMENTS.

Twelve or twenty-four of the plants raised in the seed bed in April to be divided into four equal lots, of which the first is not to be touched after planting —*i. e.*, not deprived of any flowers or leaves.

The second cut once over when first showing flower; afterwards allowed to blossom and mature seeds.

The third stripped of their leaves on the formation of the first blossoms; blossoms to remain; no leaves afterwards to be suffered to grow. While, of the fourth, the blossom buds are to be nipped off throughout the season as soon as perceived: no leaves to be cut or pulled off.

C.—PRECAUTIONS TO BE OBSERVED.

1. Manure the land required with the same kind and quantity of manure.

2. Let the drills be at the same distance apart, and the plants the same distance from each other in the drills.

3. The seed used must be from the same sample, and the thinning of the plants to be done by the same hand, and as nearly in the same way as possible.

4. The plants should be equally free from weeds, and from the shade of trees throughout.

5. Carefully weigh *all* the roots and leaves produced by each experiment or number, and dry a sample of each in an oven, to determine the relative proportions of water in each.

6. Keep notes of the dates when the leaves are cut, and of the weight produced in the green and dry state.

7. Cut and weigh the leaves of one number before you cut the plants of another.

8. Mark each experiment at the time of sowing by means of labels fixed in the soil at the foot of the drills.

D.—OBJECTS OR PURPOSE OF EXPERIMENT.

To ascertain—

1. Whether premature flowering is induced by transplanting, or is simply the result of early sowing.

2. What is the effect of sowing in seed-beds and transplanting on the quantity of produce.

3. Whether it is more beneficial to cut flowering turnips close down, or about an inch and a half up the stem.

4. Whether the turnip, by being sown early, can be profitably grown as a herbage crop in the place of rape, &c.

5. What is the difference in the quantity of roots and leaves, and in the economical value of the produce per acre, between plants cut over three times as No. 1 and No. 2, and of plants sown like those of No. 3, a month later, but not deprived of any of their leaves.

6. What is the difference in the nutritive properties of the roots of No. 1 and No. 3, as indicated by chemical analysis, and what the difference in their specific gravity.

7. What is the difference in their keeping properties.

8. What are the effects of depriving plants, not attempting to blossom, of a part or of the whole of their foliage.

9. And lastly, the experiment will be rendered complete by ascertaining the relative feeding properties of the cropped and uncropped turnips, if the quantity grown should in any case be great enough to admit of comparative trials in feeding being entered upon.

I beg thus respectfully to report these documents to the Rhins Farmers' Club.

Jan., 1848. THOS. HARKNESS, Secretary.

P.S.—As no meeting of the club has taken place for several months, I think it right to lay before the agricultural public this report, through the present medium of communication. T. H.

March 8, 1848.

SALE OF THE WISETON HERD.

Within the last quarter of a century it has frequently been our lot to eulogise the breed of short-horned cattle, which has been nurtured and brought to perfection in the district of Bassetlaw. Our earliest recollection, however, is confined to the extensive sale of cattle belonging to the late Charles Champion, Esq., of Blyth, where some extraordinary animals were offered for public competition, and realised prices which, at that period, were considered to be almost enormous. When that splendid herd was dispersed, we almost dispaired of ever again looking upon its like; but soon afterwards

we discovered that several of our neighbours were imitating Mr. Champion's example, and that instead of the breed being extinct, it was extending itself in various directions, and that, in fact, the number of breeders were being multiplied. Amongst the most conspicuous of these were the Hon. John Bridgeman Simpson, at Babworth; John Parkinson, Esq., of Leyfields; Lord Althorpe, at Wiseton; and subsequently Henry Watson, Esq., of Walkeringham, and others of minor note. One of these (Mr. Parkinson) is still pursuing the same avocation with unabated alacrity, and the splendid animals which he has produced, and which are now scattered over many parts of the United Kingdom, and through many foreign lands, will form a memento to his character long after the termination of his earthly career, and prove that by his skill and his capital he had been no ordinary benefactor to the age in which he lived. Of the others, Mr. Simpson declined the breeding system in 1837, by dispersing animals to the value of £5,796 15s. to the country at large; and in 1835, Mr. Watson followed his example by the sale of his entire herd, which realized the sum of £3,685 10s. Lord Spencer was therefore the only breeder of short-horns remaining in the extreme north of the county of Nottingham. His lordship's career, however, was shortly afterwards brought to an unlooked for and premature conclusion by the hand of death on the 1st of October, 1845, and he descended to the tomb of his ancestors amidst the regrets of the nation at large—a patriot to his country's weal, and a benefactor to the world at large.

Lord Althorpe commenced the breeding of short-horns in the year 1818, by purchasing at very high prices, at the sale of Mr. Robert Colling, of Brampton, Diana, Rosette, Nonpareil, and the bull Regent. It was at the Chilton sale, however, in 1829, that the foundation of the fame of the Wiseton herd was laid, which from the unwearied care, skill, and attention bestowed upon it by the late Earl and Mr. Hall, as years rolled on, brought it to that state of perfection, which left the late lamented Earl in the possession of the most celebrated herd of short-horns perhaps to be found in the world, and fully proved Mr. Mason's blood the most desirable in the kingdom. At Mr. Mason's Chilton sale, Lord Althorpe purchased 15 cows and heifers, and the bulls Mercury and Miracle, and a more judicious selection could not have been made. One of the most remarkable animals purchased was No. 25, the well known cow, by Richard, then three years old. The produce of this cow in the female line bred at Wiseton (exclusive of those descended from cows of the same family elsewhere, having been sold when young), has already amounted to the enormous sum of £5,168!

At the demise of Earl Spencer, his lordship demised the whole to his successor, on certain conditions; and in case these conditions were not complied with, then his lordship bequeathed them to his agent Mr. Hall. The present Earl Spencer, on hearing the conditions specified, at once declaimed the bequest, and consequently the whole of his valuable herd at once came into the possession of Mr. Hall, to whom no conditions were attached. Mr. Hall having for so many years been intimately acquainted with the breeding of cattle—and indeed it was to his care that the Wiseton herd owed no little of its celebrity—the country at large were highly delighted to find that a treasure so valuable had fallen into the lap of one so meritoriously deserving as that of their highly esteemed friend and neighbour, and the most implicit faith was placed in one so well known as the successor in breeding to his late employer and kind-hearted friend.

Mr. Hall's stock having accumulated considerably, this gentleman determined upon the sale of a portion of them, which accordingly took place in September, 1846, and which realized the splendid sum of £5,283 12s.; still leaving behind a herd not to be excelled. In 1847, the whole of the Nottinghamshire estates were advertised for sale, and amongst the rest the farm occupied by Mr. Hall. This was ultimately purchased by the Rev. Christopher Nevill, of Thorney; and the purchaser being determined to re-allot his land, Mr. Hall's farm was materially reduced, and this circumstance alone compelled him to offer the whole of his extensive herd for public competition, under the superintendence of that prince of short-horn auctioneers—Mr. Wetherell, of Durham, and which came off on the farm premises at Wiseton, on Friday, the 28th of April last.

Between one and two o'clock the company were admitted to a splendid luncheon, which had been spread in the barn, and to which the company were admitted by ticket. Here there was almost everything substantial, with all the lighter sorts of *materiel*. The ale was exceedingly good, and obtained no little praise; and the wines were capital and most bountifully supplied. Here tables full of customers succeeded tables full, until all were satisfied; and the arrangements were so perfect as to give universal satisfaction. After lunch, Mr. Torr, of Riby, who had occupied the head of the table, proposed the health of Mr. Hall, and passed a high and deserved eulogium upon that gentleman's character, and wished that he might have a good sale. This was seconded by Mr. Raynes, of Bawtry, with an amendment that it should be drunk with three times three, which was heartily responded to by all present.

Exactly at a quarter to three o'clock, Mr. Wetherell

took his appointed station, when the ring was thickly surrounded by a dense mass of spectators, whilst the rest were located on carriages, and such other vehicles as had been brought to the spot. At this moment the sun shone forth in his majesty, and gave indications that the weather would prove favourable for the completion of the day's proceedings. Mr. Wetherell then read the conditions of sale, which were as usual. He also observed that although the animals would be at the risk of the purchaser as soon as they were bought, yet he would take the best care of such as might be confided to him for the space of eight days; and when sent for, it must be by letter, as no verbal messages could possibly be attended to. The reason why the present herd was about being disposed of, was in consequence of Mr. Hall partly discontinuing farming, which had induced him to part with the whole. He need say nothing in favour of the cattle he was about to offer: the great care of the late Earl Spencer and of Mr. Hall was known to all, and a better lot was never offered to the world—he might say that fairly and fully, and without risking the slightest contradiction.

On the ground we noticed the following noblemen and gentlemen, namely:

Viscount Galway, M.P.; Hon. Captain Pelham; Hon. Mr. Wilson; Sir W. B. Cooke, Bart; Sir Thomas Cartwright, Bart.; R. G. Lumley, Esq., Tickhill Castle; Henry Walker, Esq., Blyth; H. B. Simpson, Esq., Eaton; Henry Bingham Baring, Esq., M.P.; G. Hutton, Esq., Gate Burton; Grant M'Duff, Esq., Aberdeenshire; John Barnett, Esq., master of the Cambridgeshire hounds; Godfrey Wentworth, Esq., Woolley; John Featherstonehaugh, Esq., Kirkoswald; Wm. Parker, Esq., Yanwath Hall, Penrith; Joseph Allison, Esq., Bilby; Col. Hill; Rev. W. B. Simpson, Babworth; Rev. T. H. Shepherd, Clayworth; Rev. W. C. Fenton, Mattersey; Rev. Christopher Nevile, Thorney; Rev. William Peel, Willingham; Rev. E. H. Brooksbank, Tickhill; Rev. Geo. Rolleston, Maltby; Rev. Mr. Gordon; Rev. John Bradshaw, Granby; Rev. James Cooke, Suffolk; Rev. C. W. Hudson, Saundby; Rev. J. Lakeland, Beckingham; Dr. Timm; Wm. Bethel, Esq., Rise; Dr. Dunn, Scarborough: Dr. Beevor, Newark; Col. Elmsall, Woodlands; E. W. Wilmot, Esq.; R. Hodgkinson, Esq., Morton Grange; T. Rose, Esq., Cottam; — Barnard, Esq., Ireland; Jarratt Jarratt, Esq., Elmfield House; Francis Timm, Esq., London; William Godson, Esq., Sandall Grove; Henry Watson, Esq., Walkeringham; John Booth, Esq., Killaby; Richard Booth, Esq., Worlaby; James Watson, Esq., Waudby; — Wright, Esq., Chesterfield; William Torr, Esq., Riby: Timothy Dunwell, Esq., Wilsic; John Steele, Esq., Stainton; W. Tongue, Esq., Morton; James Cross, Esq., Gringley; John Mee, Esq., Retford; Henry Bagshaw, Esq., Lound; Wm. Mee, Esq., Retford; M. W. Thorold, Esq., Carlton; Wm. Fisher, Esq., Retford; T. Dyson, Esq., Braithwell Manor; J. C. Athorpe, Esq., Dinnington; H. J. Pickard, Esq,, Hooton Roberts; — Wright, Esq., Hesley Hall; William Aldam, Esq., Frickley; J. F. G. Cooke, Esq., Alverley Hall; Henry Champion, Esq., Ranby; — Holland, Esq., Slade House, Halifax; — Payne, Esq., Southwell; — Webb, Esq., Babraham, Cambridgeshire; F. Jordan, Esq., Eaton; W. Jordan, Esq., Caythorpe: Henry Beevor, Esq., Barnby Moor; T. Bates, Esq., Kirkleavington; H. L. Maw, Esq., Tetley; J. Carr, Esq., Belton; James Dixon, Esq., Caistor; John Parkinson, Esq., Leyfields; — Whitehead, Esq., Aberdeen; — Barnes, Esq., Ireland; N. Barthorpe, Esq., Suffolk; John Gamble, Esq., Norfolk; — Drury, Esq., Lancashire; — Downes, Esq., Essex; John Morley, Esq., Eastoft; Mr. Strafford and Mr. Knowles, agents for Earl Ducie; Wm. Smith, Esq., for Sir Chas. Tempest, Bart.; Mr. Templeton, for Lord Dufferin and Claneboye; Mr. Elliott, for Earl Spencer; Mr. Swaffield, for the Duke of Devonshire; Mr. Cattle, for the Duke of Rutland; R. Ellison, Esq., Tickhill; Dr. Hall, Retford; Messrs. White, Retford; Foster, Lingodell; Skipworth, Raisin; Short, Martin; Tindall, Wheatley; Brooke, Norworth Hill; Sampson, Scaftworth; Wilkinson, Lenton; Edison, Gateford; Newham, Edlington; Raynes, Bawtry; Machin, Gateford; White, Babworth; Peck, Tiln; Lister, Babworth; Walker, Mattersey; Harrison, Everton; Brooke, Babworth; three Mr. Corringhams, Misterton; Heaton, Gainsborough; Norton, Sutton; Fox, Todwick; Dickinson, Partridge Hill, &c., &c., &c.

It is quite impossible to picture a scene of greater excitement than that presented this moment when the first lot, "Gold," was brought into the enclosure; and the production of the well-known glass, and Mr. Wetherell's "Now, gentlemen, let's see who first says one hundred for her!" proclaimed that the important business of the day had really begun. A most spirited contest at once commenced for this extraordinary cow—as a bull-breeder, doubtless proved to be one of the most valuable in the kingdom—between Mr. Parker, Mr. Wetherell, the Earl of Burlington's agent, Mr. Phillips, Sir Thomas Cartwright, and several others, every one seeming most anxious to possess Gold; and doubtless she is a mine of wealth. The first bid was 50 guineas, and she reached 130 guineas in two seconds; Sir Thomas Cartwright bid 150 guineas, and she was run out to Mr. Wetherell at 155 guineas, he having purchased her

for a gentleman who perhaps had the means of knowing her merits and value better than any one there present. How well he had estimated her worth was soon proved by her two sons, Usurer and Upstart, making the unprecedented sum of £630, Usurer having been purchased at 400 guineas for Lord Ducie, and Upstart (not a year old) at 200 guineas by Sir Thomas Cartwright. This cow and her two calves made altogether £792 15s.! We shall have a few more words to add on this subject ere our account of the sale is brought to a conclusion; and the writer of this notice was never more delighted than when it was told him that this herd, "famed," as Mr. Wetherell said, "throughout the world," is not to be entirely dispersed. After living so many years near this, the most attractive feature o the county of Nottingham, it is with pleasure and satisfaction that we announce to the public that the Wiseton herd is to be continued; Gold, Nebula (the dam of Waterwitch, sold for 125 guineas, and Weathercock, only seven months old, sold also on Friday last for 130 guineas), Corinne (daughter of old 25, above alluded to), Titania, Delphine, Jane, Amaryllis, Corset, Zaffar, Amaranth, and Brownie having been purchased by Mr. Wetherell, for Mr. R. F. Hall, the son of the late owner, and are therefore now, with other valuable shorthorns, in his possession at Wiseton. The following are the names, colour, time of birth, sire, purchaser's name, and amount of purchase:—

Lot.	Name, &c.	When Calved.	Sire.	Date of Bulling.	Gs.	Purchaser.
1	Gold, red	July 15, 1843	Orontes	Humber, Jan. 8	155	Mr. R. F. Hall.
2	Whim, roan	April 19, 1840	Hecatomb	Ditto, Dec. 2	52	Mr. Phillips.
3	Zinc, red and white	Aug. 19, 1839	Guardian	Orontes, Dec. 21	60	Mr. Featherstonhaugh.
4	Tuberose, roan	April 21, 1834	Caliph	Ditto, Dec. 1	41	Mr. Ambler.
5	Magnolia, white	Dec. 8, 1838	Fop	Ditto, Oct. 12	56	Mr. Barthropp.
6	Roguery, roan	May 7, 1832	Mercury	Ditto, April 12	26	Mr. Maw.
7	Sylph, roan	April 2, 1831	Sir Walter	Ditto, March 30	19	Mr. Guest.
8	Gertrude, roan	Sept. 26, 1839	Guardian	Humber, April 7	50	Mr. Barthropp.
9	Joan (dead)	April 4, 1839	Warlock	——	—	——
10	Serenade, roan	May 25, 1840	Roman	Orontes, April 7	26	Mr. Ambler.
11	Wallflower, roan	May 15, 1841	Orontes	Humber, Aug. 10	51	Mr. Timm.
12	Corinne, roan	June 17, 1841	Roman	Usurer, April 4	60	Mr. R. F. Hall.
13	Melody, roan	Sept. 3, 1841	Ranunculus	——	43	Mr. Timm.
14	Tutsan, red	Jan. 9, 1842	Ditto	Humber, Oct. 29	35	Sir T. Cartwright.
15	Jane, roan	March 3, 1842	Orontes	Usurer, March 30.	40	Mr. R. F. Hall.
16	Melodrame, red	March 26, 1842.	Ditto	Humber, Nov. 14	61	Mr. Timm.
17	Nubula, roan	Nov. 6, 1842	Zenith	Ditto, Nov. 23	80	Mr. R. F. Hall.
18	Marcia, roan	Jan. 12, 1843	Ranunculus	Ditto, Oct. 15	80	Sir Thos. Cartwright.
19	Minuet, roan	March 5, 1843	Orontes	——	42	Mr. Webb.
20	Belinda, red & white	April 29, 1843	Ranunculus	Usurer, April 9.	43	Mr. Webb.
21	Prophetess, white	June 24, 1843	Wizard	Ditto, Feb. 14.	50	Mr. Maw.
22	Titania, red & white	Sept. 3, 1843	Orontes	——	81	Mr. R. F. Hall.
23	Bohea, roan	Oct. 28, 1843	Wizard	Orontes, Nov. 21	47	Mr. Timm.
24	Zone, roan	Dec. 4, 1843	Orontes	Usurer, March 18.	63	Sir Thos. Cartwright.
25	Delphine, roan	Jan. 17, 1844	Wizard.	Ditto, April 1	48	Mr. R. F. Hall.
26	Elf, roan	Jan. 22, 1844	Ditto	Humber, Oct. 1	62	Mr. Thompson.
27	Feathers, roan	March 22, 1844.	D. of Corn.	Orontes, Oct. 13.	72	Sir Thos. Cartwright.
28	Banquet, red	May 2, 1844	Orontes.	Usurer, Nov. 26.	88	Mr. Phillips.
29	Guitar, roan	May 7, 1844	Zenith.	Orontes, April 16	37	Mr. Parker.
30	Neva, roan	July 6, 1844	Orontes	Wizard, Jan. 21	39	Mr. Drury.
31	Telluria, red & white.	Aug. 16, 1844.	Ditto	Usurer, Oct. 12	180	Sir Thos. Cartwright.
32	Lollypop, roan	Aug. 24, 1844.	Evander	Orontes, Nov. 14.	30	Mr. Barnard.
33	Laughter, roan	Aug. 25, 1844.	Sweetwm.	Humber, April 14	27	Hon. Mr. Pelham.
34	Spinster, roan	Jan. 6, 1845	Wizard	Orontes, March 11	33	Mr. Maw.
35	Bonbon, roan	May 29, 1845	Orontes	Usurer, March 13	110	Mr. Barnes.
36	Volage, roan	Nov. 25, 1844.	Zenith	Ditto, Sept. 6	200	Lord Ducie.
37	Saga, roan	Feb. 27, 1845	Wizard	Orontes, April 7	50	Mr. Barnes.
38	Armide, roan	April 25, 1845.	Humber	Wizard, Jan. 31	36	Hon. Mr. Wilson.
39	Waterwitch, roan	April 28, 1845.	Ditto	Usurer, Sept. 13.	125	Mr. Phillips.
40	Charmer, roan	June 12, 1845.	Ditto	Ditto, Sept. 13	28	Mr. Thompson.
41	Pride, roan	July 9, 1845	Orontes	Wizard, Dec. 26	67	Mr. Machin.
42	Pelerine, roan	Sept. 21, 1845.	Ditto	Usurer, Nov. 2	60	Lord Harewood.
43	Ceremony, roan	Nov. 16, 1845.	Lycurgus	Humber, Jan. 11	37	Lord Burlington.
44	Omen, roan	Dec. 4, 1845.	Evander	Ditto, Jan. 22	53	Hon. Mr. Pelham.
45	Pedigree, roan	Dec. 19, 1845	Ld. Warden	Orontes, March 11	57	Mr. Phillips.

Lot.	Name, &c.	When Calved.	Sire.	Date of Bulling.	Gs.	Purchaser.
46	Ladye-love, roan....	Feb. 13, 1846 ..	Ld. Warden	Humber, Dec. 17 .	51	Mr. Grant Duff.
47	Metal, red and white.	March 12, 1846.	Ditto	Usurer, March 18 .	50	Sir Thos. Cartwright.
48	Levity, roan.....	March 16, 1846.	Ditto	Humber, Feb. 18 ..	43	Hon. Mr. Pelham.
49	Lantern, roan.....	March 21, 1846.	Zenith	Usurer, Feb. 15 ..	62	Mr. Phillips.
50	Amaryllis, roan	April 2, 1846 ..	Ditto	Ditto, March 30 ..	58	Mr. R. F. Hall.
51	Sibyl, roan	April 5, 1846 ..	Ld. Warden	Orontes, March 19	53	Mr. Smith.
52	Spae Wife, roan....	April 13, 1846..	Evander ..	Usurer, April, 13..	42	Mr. Lakin.
53	Cycle, roan	May 5, 1846 ...	King Lear..	Ditto, March 3. ...	71	Mr. Lawson.
54	Prudence, roan ...	June 14, 1846 ..	Orontes ...	——	60	Mr. Gamble.
55	Octave, roan	June 23, 1846..	Humber ...	——	66	Mr. Whitehead.
56	Ephemera, roan	Sept. 8, 1846 ...	Wizard ...	——	—	Not offered.
57	Talc, roan	Oct. 22, 1846 ...	Humber...	——	71	Mr. Thompson.
58	Joy, roan	Oct. 30, 1846 ...	Ditto	——	30	Mr. Cooke.
59	Gratitude, roan	Oct. 31, 1846 ...	Wizard ...	——	38	Mr. Featherstonhaugh.
60	Evergreen, roan	Jan. 20, 1847 ...	Lycurgus..	——	33	Mr. Smith.
61	Lunette, roan	March 20, 1847 .	Humber ...	——	70	Mr. Phillips.
62	Arachne, roan.....	April 4, 1847 ...	Lamplightr.	——	20	Hon. Mr. Wilson.
63	Corset, roan... ..	April 9, 1847. ..	Ditto	——	71	Mr. R. F. Hall.
64	Zaffar, red	June 9, 1847 ...	Orontes ...	——	46	Mr. R. F. Hall.
65	Amaranth, roan	June 14, 1847 ..	Evander...	——	57	Mr. R. F. Hall.
66	Saxifrage, roan	June 15, 1847 ..	Humber...	——	33	Lord Dufferin.
67	Guile, red	July 25, 1847 ..	Evander ..	——	18	Mr. Cooke.
68	Enigma, red	Sept. 5, 1847 ..	Wizard ...	——	40	Mr. Topham.
69	Trinket, red & white.	Sept. 17, 1847 ..	Humber ..	——	51	Mr. King.
70	Sorcery, white	Sept. 8, 1847 ...	Ditto	——	60	Hon. Mr. Pelham.
71	Goodness, roan	Sept. 14, 1847..	Orontes .	——	52	Lord Burlington.
72	Vaudeville, red & wh.	Sept. 20, 1847..	Humber ..	——	50	Sir Thos. Cartwright.
73	Lady Bountiful, roan	Dec. 21, 1847 .	Usurer....	——	40	Mr. Dudding.
74	Epitaph, roan	Dec. 30, 1847 ..	Humber ...	——	44	Sir Thos. Cartwright.
74A	Jollity, red & white. .	Feb. 11, 1848...	Ditto	——	20	Mr. Smith.

Lot.	Name, &c.	When Calved.	Sire.	Gs.	Purchaser.
75	Usurer, roan	April 8, 1846	The Lord Walden .	400	Lord Ducie.
76	Ich Dien, roan.....	Jan. 1, 1847	Lamplighter	63	Mr. Mace.
77	Flageolet, red	May 8, 1847.....	Ditto	54	Mr. Cooke.
78	Upstart, roan.....	May 8, 1847.....	Ditto	200	Sir Thos. Cartwright.
79	Weathercock, red	Sept. 26, 1847.....	Orontes	130	Mr. Phillips.
80	Brownie, roan.....	Nov. 23, 1847.....	Humber.....	70	Mr. R. F. Hall.
81	Orontes, red	March 19, 1837.....	William	70	Sir W. B. Cooke.
82	Humber, roan.....	Nov. 24, 1842	Orontes	71	Marquis of Exeter.
83	Moidore, red and white.....	Jan. 18, 1847	Lamplighter	66	Mr. Crump.
84	Gondolier, roan	March 5, 1847	Ditto	50	Lord Burlington.
85	St. George, red.....	April 19, 1847.....	Orontes	77	Hon. Mr. Pelham.
86	Oswald, white.....	June 10, 1847.....	Evander.....	36	Mr. Slater.
87	Tallyho, roan	Oct. 18, 1847	Humber	17	Mr. Barnard.
88	Momus, roan	Feb. 6, 1848.....	Ditto	14	Mr. Field.
89	Sugar-plum, red	Feb. 8, 1848.....	Usurer.....	52	Mr. Downes.
90	Sara Sand, red and white ...	Feb. 23, 1848.....	Ditto	—	Not offered.

The total amount of the sale was £5,743 10s., giving an average of £58 19s. 5d. for the cows and heifers, and of £95 18s. for the bulls.

In conclusion, we may add that it would have been to us a very painful task to have taken leave of the Wiseton herd for ever, to have laid down our pen with the conviction that what it had taken years to accomplish and bring to the highest perfection was for ever dispersed. A more pleasing duty, however, happily remains for us. Already possessed of many animals, all of the best possible blood in the world, the very fortunate owner of Gold and Nebula, the dams of those animals which brought those extraordinary prices last year, may be said to have a most truly valuable herd: and in rearing and increasing it, he will have the advantage of being assisted by the advice and long experience of his father. That the herd will be maintained altogether regardless of expense, was proved by the very high prices at which the selected cows and heifers were obtained last Friday; and if anything can give a certainty of success, we had a proof of it in the splendid form, quality, and condition of the ninety animals offered for sale on that

occasion, a great many of which (including Usurer, Upstart, and Weathercock) had been bred by Mr. Hall, since the death of Earl Spencer. We are, therefore, quite certain this herd will still continue to be a leading feature of interest in the northern division of the county of Nottingham, and that we shall be most heartily joined, not only by our neighbours and friends, but by the breeders of shorthorns through England, in wishing success to the Wiseton herd, and a long and prosperous life to its owner.—Doncaster Gazette.

JACK TAR.

ENGRAVED BY J. MOOR, FROM A PAINTING BY W. H. DAVIS.

[The following article, having reference to JACK TAR, is taken from the *Sporting Magazine* :]—

The meeting of the Royal Agricultural Society at Northampton last year was the means of starting an interesting discussion on a subject that could not have been introduced anywhere more appropriately than in that sporting shire. Sir Harry Smith, one of the great features of the show, took occasion, in returning thanks for the honour so enthusiastically paid him, to confess himself a sportsman as well as a soldier; to speak of the many capital days he had enjoyed of yore in charging the Pytchley blackthorns; and "thirdly," to advise the Society to pay every attention they could to keeping up the breed of hunters.

Had "the man of war" stopped here, few would have questioned the loud cheers that accompanied nearly every sentence of his speech. Sir Harry, however, followed up his recommendation to the Council by giving it as his own opinion that this breed of animal had greatly deteriorated of late years, and consequently that if five hundred such horses were wanted on an emergency for mounting cavalry, there would be a great difficulty, if not an actual impossibility, in obtaining them. On this point the house divided, some taking it as indisputable authority, while others were prepared to dispute the opinion *in toto*. Amongst the former appeared Mr. V. S. Cherry, armed with a pamphlet that had for its aim the altering the conditions on which the Queen's guineas were in future to be given, viz., to be shown for instead of run for; Mr. Cherry starting from the assumed fact that as the breed had fallen off, there must be something radically wrong in the distribution of those prizes by which it was intended to be encouraged.

Against Mr. Cherry and his essay appeared Mr. Goodwin, and again against Mr. Goodwin answered Mr. Godwin—Mr. Pegasus, the celebrated Turf oracle of *Bell's Life*, giving his support to Goodwin, *versus* the firm of Smith, Cherry, and Co. For our part, we decidedly think the "Noes have it." From the very recent period when we paid all the honour we were able to so good a man as Sir Harry Smith, we shall, we are sure, not be thought carping at his well-earned popularity in stating that we think the hero's words could not on any fair grounds be taken with the weight here that would attach to them on many other subjects. The greater part of his life has been passed in foreign countries about the tropics, a region where animals of all kinds are well known to be of diminished dimensions, while his short stay in England could never have been sufficient to properly test the opinions he had conceived on service.

Pegasus says, instead of five hundred good hunters being a difficult task to collect, it would be tolerably easy to make them five thousand; and we say so too. For one grand crack hunter twenty years ago, we could name twenty now. Such celebrities as Mr. Linslow's The Clipper, Mr. Best's Confidence, and one or two others, might now be multiplied over and over again. For Lord Plymouth's one stable of thorough-bred weight-carrying horses, we could name a dozen or two at any time, in any of our crack hunting countries. Take a large field of our steeple-chase horses as we see them year after year brought out, and then consider if you could have commanded such a sight as that thirty years ago; the best and purest bred horses in the world, possessing courage, strength, and speed beautifully combined, and all in the highest degree of excellence. People talk about weedy jades, with ten or eleven stone on them, going just one spin of four miles or so, when the good old English hunter would have dropped suffocated before he could have gone one mile at such a pace as these "jades" make it; while as for a succession of work the modern would wear the ancient out two or three times over. If any breed of animal has improved within the present century, it is the English hunter; and if any has multiplied, it is this kind of horse. For one man that went to meet hounds in 1800, perhaps a hundred go now—for one man in a field that rode to hounds then, twenty ride now—there are far more men keep hunters, and far more *ride* them—hounds go faster,

and horses go with them. If, under these circumstances, the English hunter has decreased and degenerated, it is beyond our "ken" to account for it.

That the £30 premium from the Royal Agricultural Society has, or ever will have, much share in effecting this progressive advance, we do not believe. Indeed, we think the members of the Society themselves look on it with far less interest than they do to the prizes in other classes. The improvement in the horse comes direct from the Turf, and well-intentioned Mr. Cherry, in his care to avoid a purely imaginary evil, would have taken precisely the surest means for making it a real one. The well-bred horse can scarcely ever be properly estimated in the show-yard; his province not being the putting on fat in proper places, or exhibiting a fine woolly coat, takes him rather out of the line of the judges; besides, with no animal is "like begets like" more uncertain. Meteor, son of Eclipse, was a mean-looking little horse, not within an inch or two of fifteen hands, and he got some of the finest and largest stock ever seen. Such instances, or *vice versâ*, might be repeated to almost an unlimited extent, all tending to prove that the "Show" and "Go" do not here approximate.

About the safest mark in breeding from the thorough-bred horse is pedigree; but this has, we have heard, had but little consideration from the judges selected to pick out the winner at the great July Meetings; in fact, in some of the early lists, while dam, grandam, and great-grandam of shorthorns are given *ad infinitum* from the Herd Book, the name of the sire or dam of the best horse has been altogether omitted. To afford our readers some idea of the class of horse that Jack Tar may have had to contend with for his honours, we have gone over the awards from the first year's show at Oxford, in 1839, when, we remember, not one of the exhibited was thought worthy of the prize: the following year, at Cambridge, it was paid to Mr. J. Reynolds, of Wisbech, for his eight-year-old horse; but, as neither name nor pedigree are added, we are unable to say what horse this was. In 1841, at Liverpool, no such class is mentioned; so that we lead off with our illustration of the sort.

1842.—Bristol.—Jack Tar, by Emilius, out of Sheldrake, by Scud.

1843.—Derby.—Johnny Boy, by Jerry, dam (Beeswing's dam), by Ardrossan.

1844.—Southampton.—Horse by Langar, dam by Cervantes.

1845.—Shrewsbury.—Clarion, by Sultan, out of Clara, by Filho da Puta.

1846.—Newcastle.—Newsmonger, by Voltaire, out of Cyprian, by Partizan.

In 1847, at Northampton, we can find none mentioned.

Of all these, none came more in character with the exhibition at which he appeared than Jack Tar. It will be seen, from his portrait, that the elegance of the thorough-bred horse is but little marked in his appearance; indeed, he rather presents that plain useful sort of front we can fancy striking so home to the hearts of the agriculturists. As still, though, he also appeared on the turf, we shall conclude our notice with the particulars we usually add concerning all the high-mettled that honour our pages.

Pedigree.

Jack Tar, a chestnut horse, bred by the Duke of Cleveland in 1827, is by Emilius, out of Sheldrake (sister to Sailor), by Scud, her dam, Goosander, by Hambletonian—Ruby, sister to Rebel, by Trumpater.

Emilius, by Orville, out of Emily, by Stamford, won the Derby, and was about the best stud-horse ever known, getting more and better winners than any two horses of his day.

Sheldrake was remarkable neither in the stable nor the stud.

Performances.

In 1830, we find the Sheldrake colt, then three years old, first appearing as the property of the Marquis, afterwards Duke of, Cleveland, at Newmarket Craven Meeting, where he ran second to Lord Exeter's Augustus, for a Sweepstakes of 100 sovs. each. Mr. Wilson's colt by Middleton also started.

At the first Spring Meeting, ridden by Chifney, he won the Spring Underley Stakes of 100 sovs. each, beating Mr. Cooper's Prima Donna colt.

At Epsom he was not placed for the Derby, won by Mr. W. Chifney's Priam, Sam Chifney having to give up his seat on the winner to ride him.

At Stockbridge, having passed into Mr. Shard's hands, he was not placed for a Sweepstakes of 5 sovs. each, won by Mr. Delmè Radcliffe's The Colonel.

At Salisbury he ran third and last for the Wiltshire Stakes; won by Mr. Bigg's Tyke.

In 1831 he only ran once, when he was not placed for the Borough Members' Plate at St. Alban's; won by Mr. Isaac Day's Busk.

The Sheldrake colt never appeared in public after this till, as Mr. Hillyer Reeve's Jack Tar, he carried off the £30 at Bristol, and in commemoration of which his portrait was taken. The horse is now, we believe, gone abroad, but he covered for some seasons at low prices in the neighbourhood of Swindon, and is the sire of Bird's-eye Betty Lop, and that tolerably good cocktail, Master Tommy.

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

The usual monthly meeting for discussion was held at the club-rooms, Bridge-street, Blackfriars, on Monday, May 1, 1848; Mr. W. Shaw, of London, in the chair. Subject—"An inquiry as to the relative proportions of Burdens borne by the Fixed Capital, compared to those borne by the Floating Capital in Land."

The CHAIRMAN, before proceeding to the business of the evening, wished to offer a few observations as to the discussion upon draining, which took place in March last. He was induced to do this from the many complaints which had reached him of the prejudicial effect the manner in which that subject was treated might have on the interests of the club if continued in other cases. He (the Chairman) at the time had impressed the necessity of discussing the question of deep *versus* shallow draining without introducing the names of any particular persons. He regretted that he had not done this in clearer and more forcible terms, sufficiently strong to restrain the proposer of the subject, Mr. Webster, from directly attacking the operations of parties who were not present. He was sorry Mr. Webster was not present, in order that he might have the opportunity of communicating to him personally the animadversion his course of proceeding had caused, and the injury and injustice it was calculated to produce. The discussions of the club should be conducted on broad and abstract principles; and when instances of failure or success were adduced, all the facts should be carefully and correctly ascertained, and truthfully and conscientiously stated. The gentleman he had now to introduce to the meeting would, he was sure, see the propriety of keeping to this rule in treating the subject he was about to introduce, one of the greatest importance the club could possibly entertain, and which he doubted not Mr. Latimore would elucidate with his well-known ability.

The Chairman having introduced Mr. LATIMORE to the meeting, he addressed the meeting as follows: Gentlemen, permit me, in the first place, to express my entire concurrence in the excellent observations of our worthy Chairman, respecting the wisdom of avoiding all personalities in discussing great questions and important principles (Hear). If I should be asked why I had undertaken to introduce the subject on the card for this evening's discussion, I reply at once, because I believe it to be the *most important one* to the interests of the tenant farmers of this country which has not yet been discussed by the members of the Club (Hear). I have waited long, in order to see if any older and more experienced member would introduce it; but as no one had done so, I resolved to grapple with the subject, which is indeed a very difficult one, and to endeavour honestly and fearlessly to sift it to the bottom (Hear). My object is the elicitation of truth, but I make no pretensions to *critical* accuracy: my plan has been to take the best authorities I could find upon any part of the subject, which I am willing to name to the meeting; and where no competent authority could be obtained, then I consulted able and experienced men of business, and endeavoured calmly and dispassionately to arrive at a safe and practical conclusion. And with this feeling, I now solicit the practical farmers assembled around me to aid me in solving the more difficult and abstruse parts of the question (Hear). I am perfectly aware that in bringing forward a question of this kind I am exposed to the shafts of criticism, and to all sorts of misconstruction of my statements and motives; but, supported by the rectitude of my intentions, and feeling the vast national importance of the subject, I challenge every one to meet me in the spirit with which I introduce the subject (Hear). I have long witnessed with great pain the progressive decay of many farmers, whose little capital has been gradually melting away, and was sincerely anxious to inquire whether the burdens upon that capital were fairly estimated and fully understood by the occupiers of the soil. There can be no harm in this inquiry, while it will tend to exercise men's minds on the important question of income and expenditure upon land, and thus to show the probabilities of success on the one hand, or the causes of failure on the other (Hear). And I believe that a correct knowledge of these points is equally desirable to the landowners. There can be no permanent benefit to *them* from any disguise of the *real burdens* upon the occupiers any more than there can be to the individual tenant who might be induced to rush into any self-deceptive contract (Hear). I believe, and I will fortify myself with some references to public authorities upon this point, that a very important influence upon the social and moral welfare of the community must always be produced by the good or bad cultivation of the soil (Hear). In enumerating the payments made by the floating capital, a distinction must always be made between taxation and current expenses; but, in order to grapple with the question, it is necessary to depict the whole expenditure (under whatever heads) and the probable annual returns, in order that, by striking a balance, something like a sound conclusion may be attained as to the aggregate profit or loss, and the *proportions* of the burdens to which either description of capital in land (fixed or floating) is annually subjected. This question is not introduced with a view to any invidious distinction. I freely state, that wherever owners of land occupy their own soil, they pay all the burdens levied on both fixed and floating capital. But as a very large proportion of the soil of this kingdom is held by tenants, it behoves all classes honestly and truthfully to investigate the burdens for which they become responsible. It appears to me that a correct knowledge of the duties and responsibilities of life is indispensably necessary to

a right performance of them. The want of such due estimation often leads men into undertakings from which they would otherwise instinctively shrink. Nor can I perceive any *ultimate* advantage to be derived from a state of darkness or ignorance. With respect to the great responsibility devolved upon every occupier of the soil, it may perhaps be thought that my views are *too austere;* but I certainly entertain the deepest conviction that the social and public duties of every farmer are of an important nature, and require great consideration and unceasing perseverance properly to fulfil them. I have been repeatedly consulted as to the desirability of placing young men, possessed of capital and education, as tenant farmers: and with the present lamentable state of the law as regards the security of the capital of the occupying farmer, and consequently of his social and political independence, I have invariably felt it to be my duty conscientiously to dissuade parents and guardians from choosing that occupation for their children or wards. There exists a natural preference in youthful minds for farming and out-door occupations to sedentary employments, and especially at that period of life, well described by the poet—

> "When we cut our cable, launch into the world,
> And fondly deem each wind and star our friend."

It is very difficult to impress upon young minds the full responsibilities and burdens of such an undertaking. It appears to me that a rack-renting tenant-at-will farmer must forego the luxury of a wife, or the maintenance of a conscientious course of action upon all political and public matters. In the usual discussions upon taking a farm, how common it is to hear the parties speak of the *rent only* as a matter of consequence, overlooking all the other pecuniary burdens, and leaving out the moral obligations and duties altogether. I am not an advocate for deception, believing that no permanent advantage can be gained thereby to the community, much less to the individual who blindly rushes into an act of self-deception. It is with these convictions, and animated with a sincere desire to promote the welfare and happiness of all classes of my countrymen, and especially of those immediately connected with the soil, that I have ventured to introduce for consideration the important subject of this evening's discussion. The present state of the tenantry of this country is one which must be admitted to need improvement. If I were to enter into a comparison between this country and Scotland, I should say that though rents are higher in Scotland than here, the local burdens are lighter; and allowing for the difference in the extent of the acreage of the two countries, the prevalence of leases in Scotland and the use of machinery, the difference is not so great as it appears at first sight. The tenant-farmer in England can scarcely be said to have any legal existence. On this subject permit me to read an extract from the *Economist*—a paper rather in favour of the *laissez-faire* and mutual confidence system. It says—"In disputes between landlord and tenant, the state of the law, it is true, often subjects the tenant both to great expense and to great injustice. But this is one of those unfair inequalities to which the public attention has been recently awakened, is now the daily theme of many influential tongues and pens both in Parliament and in the press, and which cannot long survive daylight and discussion. The costly unwieldiness of our law system, then, though a grievous evil, is one which scarcely touches the working classes, though it bears with much severity on the middle classes and the farmers." Now I hail these remarks as shewing that an impression is being made on minds which have perhaps been rather unwilling to learn the truth. The writer further says—"That government under which capital is most secure and sacred, and commerce and industry most free and unshackled, will always be that under which labour will be most constantly employed and most handsomely remunerated." So much for the farmers. Now how stands the case with the working people? Gentlemen, we should never shut our eyes to the signs of the times. I am advising every farmer to turn his attention to the burdens connected with his own occupation of the soil, and to endeavour to do justice at once to himself, to his family, and to his country. Now in reading a leading article in the *Times* of April 27, I was very much struck with some remarks which I think *apropos* to this discussion. Speaking of the state of France, and of the working classes generally, the writer says:—"First, then, it is a very wholesome and profitable question, 'What is it that has a third time revolutionized France?' It is her myriads destitute of profitable employment." That is a great truth which might have been found out years ago, but I hope it will be generally recognised now. "In the most luxurious capital in the world, in the midst of everything that can fire the senses, kindle the ambition, impart activity to the intellect and refinement to the taste—among palaces, gardens, theatres, and picture galleries, were lately not less than a hundred thousand men unemployed, homeless, and hopeless. The 24th of February did not pass without writing on the very face of the catastrophe its social and industrial character. Louis Philippe was driven from his throne not so much by conspirators and disappointed politicians, though they had much to do with his downfal, as by hungry operatives and labourers." That is very important here. The writer proceeds: "Say what we will about loyalty and order, let us urge them ever so much as paramount duties, still the truth must be confessed — What is a crown to the starving? What are institutions to the outcast? What are princes and princesses to those whose own children cry for bread? And what is public order to him who beholds in it nothing but a serried phalanx of the prosperous classes marshalled against him? In the best times, and under the wisest governments, there are and ever must be a miserable section who view society as it were from without. There always must be the incompetent, the unfortunate, and the disgraced—men who cannot be helped, because they will not help themselves. But it is the highest interest and duty of government to diminish these dangerous classes. In Paris it has long been a matter of remark that they had acquired a gigantic and almost incredible proportion. Writers of all

parties on this side the Channel have long pointed out the fearful bearings of this fact. In France the tree has at length borne its fruit. It is now our turn to look to our own country." Now I believe that the subject which we have to consider this evening has direct reference to the question of giving employment to the masses, and of promoting their social welfare; and therefore I consider it extremely important to notice this point. In further illustration of this I will just trouble you with one more extract: it is from a speech made by Mr. Reynolds, an Irish member of parliament, a short time back. Speaking of the state of his own country, he says 'Let hon. members consider the distress that existed. Let him remind them that, in Ireland, 1,000,000 of human beings had sunk into their graves from starvation within eighteen months. Let them remember the horrible case that within a fortnight had been brought before the Galway Assizes, in which a man had been convicted of sheep-stealing, and Mr. Dobbin, a stipendiary magistrate, had applied in favour of the prisoner, on account of the extenuating circumstances in his case. One of his children had died of starvation, and the wife of the man had fed upon the flesh of that child before he violated the law to procure food. Mr. Dobbin had caused the body to be disinterred, and the limbs were found picked to the bone. In that case the judge shed tears, and the jury shed tears, and the man was discharged. That case was an illustration of the widely-spread and terrible distress under which his countrymen were suffering." Now, I will not charge any human being with indifference to these sufferings. Every man must sympathise in them; but how much nobler and more honourable is it to endeavour to prevent such things than merely to sympathise with the sufferers! We are engaged, as it were, in the clearing work; and it should be our effort to remove the brushwood as we proceed, in order that the soil may in future years yield a harvest of plenty. I come now to the question of the obligations of the occupiers of the soil, which may be resolved into two parts—the pecuniary burdens, and the moral obligations. In treating of the pecuniary burdens I purpose to consider, first, those which fall upon the floating or industrial capital of the occupiers of the soil, and which I place in this order because they form the larger proportion; and, secondly, such as are chargeable upon the fixed capital—the land. It is scarcely necessary to say that whenever the soil is cultivated by its owner, all burdens chargeable upon the same are wholly borne by such owner; but as at least nine-tenths of the soil of the United Kingdom is held by occupiers, a proper knowledge of the proportionate burdens borne by the floating capital is highly desirable. The importance of this inquiry can scarcely be denied when it is considered as affecting an interest in which £300,000,000 of industrial capital is embarked, and engaging the attention in the United Kingdom, according to Mr. Spackman, of farmers and graziers 778,463, and of agricultural labourers 2,495,440. I will now proceed to enumerate some of the pecuniary burdens to which the floating capital of the occupiers of the soil in England and Wales (to which part of the United Kingdom I purpose to confine these statements) is annually subjected. Now I shall quote from this work of Mr. Spackman's for two or three reasons: it is the most recently published work; it has been got up at great labour and expence, and with much care; it is dedicated to the Duke of Richmond; and it is published at the expense of the Protection Society. It is, on the whole, the best authority that I can obtain upon such matters, and therefore I refer to it (laughter). I am sure I shall not be blamed for taking this course (Hear, hear, and laughter). I assure you, gentlemen, that I am most anxious on this occasion to arrive at the truth (Hear, hear). I make no pretensions whatever to critical accuracy. I am willing to give you my authority for every item. Where I could find no written authority bearing upon a point, I have made the best inquiries I could of the soundest practical men within my reach, and in stating the result I shall endeavour to be a little short of the mark instead of being over it. If any gentleman thinks that my statements are erroneous, I shall be exceedingly happy to hear his views and to be converted by him. Now the acreage in England is 32,243,200. The rental per acre Mr. Spackman states at £1 3s. 5¼d., giving a gross rental for England in 1842 and 1843 of £37,795,905. Wales contains 4,752,200 acres, of which the rental is 9s. 11¾d. per acre, giving a total for Wales of £2,371,184. Thus the total rental for England and Wales is £40,167,089. The next burden which I will take is the poor and county rates. Now I deduct from those rates one-third as paid by the towns. Mr. Spackman does not clearly separate the two, but I think you will agree with me that the land pays at least two-thirds of the whole amount (Hear, hear). Making that deduction, there is paid in England £2,860,668, in Wales £203,880, making a total of £3,064,548. The next item is highway rates. In England the amount is £487,256, in Wales £23,980; total £511,236. The next is church rates. In England £217,148, in Wales £7,604; total £224,752. Then there is turnpike trusts. In England £586,109, in Wales £39,928; total £626,037. The next burden is tithes. Now I am aware that some persons may be disposed to argue that tithes are no burden to the farmer; they will ask, "If the land be tithe-free, does it not fetch more rent?" I am not here to deny anything of that kind.—I have already admitted that if the land be occupied by the owner, every burden is met by the owner; but I am here to consider what proportion of the burden is borne by the occupier. I maintain that in the majority of cases, and with the rental which Mr. Spackman gives, the tithes are paid chiefly by the occupier. Under these circumstances, I have endeavoured to get the amount of tithes on the best authority. I know I am, in fact, under the mark, but I dare not give you a higher sum than I have authority. In an encyclopædia which is considered a standard work, the tithes of England, Wales, and Ireland, are stated at £4,000,000 per annum. Now Mr. Spackman allows £500,000 for Ireland, leaving £3,500,000 for England and Wales. This estimate was taken before the commutation of tithes was general; I

know that in my own instance the tithes have since been raised 20 per cent., and I am not aware of any case where any corresponding reduction has been made in favour of the tenant; therefore, there is not only the £3,500,000, but the additional amount which is the result of the Tithe Commutation Act, and I feel that in putting down what I have done I am under the mark. Enquiry will, no doubt, take place on this subject. We shall soon have a report, perhaps, from the Tithe Commissioners, and then we shall be able to come to a correct conclusion. The next item is the property-tax, which, being taken at half the rental, amounts to £585,770. The next item comes under the head of excise duties on the necessary articles of consumption by labourers. I dare say a great many persons will be ready to dispute that point. They will say, "Well, if we drink porter and ale in a city, we pay the tax as well as you." But I argue that, as farmers, sitting here and knowing the wants of your labourers, knowing that you cannot get your work done without malt liquor, and feeling, as I believe the majority of you do, that it is indispensably necessary to your labourers, you would be cowards if, at a moment like this, you were to flinch from publishing this item far and wide as a burden (Hear, hear). I have regarded the excise duties upon malt and hops as inflicting a burden of £2,500,000 annually upon the agriculturists of England and Wales, and I believe that the evil is a much greater one than it would appear to be from that statement (Hear, hear). The next item is legacy and probate duties. Now all personal and industrial property pays those duties. It is not easy to say exactly what amount is paid by agriculturists, but we know that agriculturists die like other men, and that by a calculation of ages you may in fact get at something near the truth. I calculate that in England and Wales the floating capital which keeps the land in cultivation amounts to £230,000,000. Now upon that amount there may be 1 per cent. paid or 5 per cent.; but I will take it at £1,500,000 per annum, and I believe that that does not cover it. Now, gentlemen, as regards these items, the poor and county rates, highway rates, church rates, and turnpike trusts, are taken from returns made by the Poor Law Commissioners in 1842. I put it to you whether within the last two or three years the poor-rates have not in many districts enormously increased (Hear, hear). I can answer for the Union in which I live that the increase in the rates amounts in some parishes to full 20 per cent. I have no hesitation in saying that the poor-rates paid in 1846-7, and up to the present time, have increased to the extent of £1,000,000, as compared with 1842. I may at all events put down an increase of £500,000, which is to be added, you will remember, to the items taken from the returns of Mr. Spackman. The total amount of rent, tithes, charges, and taxation, which I have thus stated, is £53,179,432. Now, gentlemen, to these items are to be added some other little matters, which, however we may overlook them, cannot long be safely disregarded. The first which I come to is agricultural labour. You will all agree that that is a necessary article. The payments under this head no doubt differ considerably in different parts of the country; there may be a variation of 20, 30, or 40 per cent. in the payments made on different farms, but all will admit that it is a very low rate of labour which is not something like equal to the rent (Hear, hear). I think you will all agree that in this country it would not be safe to estimate the annual amount of labour, which of course varies with varying circumstances, at less than about the amount of the rent; and I therefore put that down at £40,000,000 per annum for England and Wales, or somewhat less than the gross rental. The next point is the mechanical labour, including the work performed by blacksmiths, wheelwrights, carpenters, and others of the same description. That is what I mean by mechanical labour. There is a great difference of opinion amongst those to whom I have spoken as to the amount at which that item ought to be fixed. Some persons have told me that 10 per cent. would be a fair amount; others have thought that that amount would be too much. After taking a calm view of the matter, and consulting the best authorities that were open to me, I have thought it right to put that down at 8 per cent., at which rate the total amount is £3,200,000. The next point to which I will call your attention is the annual losses on live stock. All those who are keepers of live stock well know that losses are unavoidable. Sometimes you have an epidemic, sometimes a pleuro-pneumonia; but losses of some kind it is not possible to avoid. Wherever I have made inquiries, parties have told me that their losses under this head have been very great. Personally I have sustained a very considerable loss. I was conversing the other day with a steward who has the management of a farm, and I asked him what he thought would be a fair computation, as far as his experience enabled him to judge. "Ten per cent.?" I asked. "Ten per cent.," he replied, "is too low." I rejoined, "In some cases it might be too high; and I don't want to put it above the mark." "Well," he said, "I will state my own case. I have lost 20 per cent. upon my sheep, and 95 per cent. upon my lambs." Under these circumstances, I think it would not be fair or just to the farmers to put this item at less than 7½ per cent. I take my returns of value from Mr. Porter and Mr. M'Culloch, and I arrive at a loss of £8,192,140 upon a fair estimate of the stock. Now the next item which I come to—and this, again, must not be overlooked, however we may be disposed to forget it—is wear and tear; the annual deterioration in the value of live and dead stock, such as horses, oxen, ploughs, harrows, carts, and so on. If any of you gentlemen should forget this, and it should afterwards be your lot to employ one of those useful gentlemen called auctioneers, you will be reminded of it (laughter). This item I have taken at 7½ per cent. Many persons will maintain that 10 per cent. is little enough; but after looking at various calculations on the subject, and considering the fact that a great portion of this country consists of grass land, upon which such implements as I have mentioned are not very frequently used, I have set down the amount at 7½ per cent.; and I am quite sure

that if any gentleman goes to a farm, buying everything new, occupies it for ten years, and at the expiration of that period has an auction, he will find that 7½ per cent. is not too much under that head. This allowance gives a sum of £8,998,000. Now, gentlemen, I am coming to another item, which, though it is equally necessary, some of you may deny to be a burden. I do not call it a tax, but it is what the farmer must pay; and I am going just now to speak of the full amount of produce. I must observe that without this item you would never get any return for your exertions. I now refer to seed-corn, grasses, turnip-seed, and all charges of that kind. I estimate the acreage sown with corn at 11,200,000; and taking this at 16s. 8d. per acre, the whole will come to £10,000,000 per annum. Now the next item which stands on the list is the interest upon the £230,000,000 of capital employed in the cultivation of the soil. Some of you may object that you could never find any interest. Well, never mind: there ought to be interest. Don't give your capital away; you cannot afford to do so: and if you have done so hitherto, I call upon you now to look the matter in the face. The interest, then, I put at 5 per cent., which will give £11,500,000. That, at all events, is not overdone. I do not know any capital in this metropolis which would be invested, when subjected to such vicissitudes, for less interest than 5 per cent. Adding all these items together, we arrive at a grand total of £135,069,572. There are several other items which I consider extremely burdensome to the occupiers of land, but which it is difficult to estimate correctly in a pecuniary sense. I will therefore briefly enumerate them, leaving every intelligent and practical farmer in the kingdom to put on them his own estimate. The first of these burdens is the ravages by game. It is not very easy accurately to estimate that item. I know that in the evidence which was given before the committee of the House of Commons on this subject, some of the witnesses declared their conviction that the losses and ravages by game exceeded the whole of the local burdens—poor-rates, county-rates, highway-rates, church-rates, turnpike trusts—exceeded all these put together. If the loss amounted to only half that sum, it would still be very considerable, extending, in fact, to some millions for the whole country! But I forbear to attempt to form any estimate. In some parts of the country there is no damage committed; in others the damage is only partial; while again in others it is very great. You will all, however, agree that whatever damage is done by the game is, in fact, done to the floating capital (Hear, hear). Well now, gentlemen, there is another item upon which I daresay many of you will differ with me. It is what I call the expense of agents and land-valuers (laughter). Now you will object, perhaps, that tenants do not pay such persons. I admit that directly they do not; but indirectly I think they do. Now Mr. Spackman estimates the number of agents and gamekeepers in the United Kingdom as follows (laughter): I hope, gentlemen, you are not afraid to look the matter in the face (Hear, hear). We may find this army to be an army of friends; and if so, I, for one, shall hail it as such (laughter). At all events, I must not shrink from the duty which I have undertaken to perform. Now Mr. Spackman estimates the number of land-agents in the United Kingdom at 174; land-stewards 4,829; gamekeepers 439. The total of the three classes combined is 5,442. Now that is a goodly army, and somehow or other these gentlemen generally thrive (laughter). I wish to see every man thrive; but then I want such persons to thrive in conjunction with the prosperity of the farmer. Well, you must put your own value on those men (laughter). Why, gentlemen, I could not undertake correctly to estimate the value of the intellect and far-sightedness of those gentlemen; but this I will say: if we may judge of their ability from the prosperity of their own circumstances, it is not a very slight pecuniary amount which would repay them for their services. I will not, therefore, make any pecuniary charge for them: I only mention them. The next item which I come to is this: It is a very heavy burden indeed—the total absence of all legal recognition of, or security for, floating capital (Hear, hear). I think that is a great drawback to the farmer. Next I come to the daily uncertainty under which tenant farmers carry on their occupations — an uncertainty tending to drive capital and confidence from the soil. Now these will all be disputed as being immediate burdens on the farmer; but somehow I cannot help thinking that in one way or other they tend to increase the burden on the soil, and to leave so much less for the cultivator. As I said before, I make no pretension to critical accuracy in detailing these burdens, and therefore I trust that you will receive me with indulgence, and at least give me credit for not desiring to misstate anything, but simply to bring the whole of the facts before you (cheers). I would venture to put it to any gentleman present, or to any farmer in England and Wales, whether he believes that these burdens and responsibilities are at present duly considered. I have some remarks to make on the other side, which will help you to come to the same conclusion as I have done. It can be no great matter of surprise, however, when the whole subject is fairly examined, that farmers as a body do not prosper—that they do not increase their capital to any great amount; or that where they do (I myself have known such instances as this) the capital accumulated has been saved from the wants and sustenance of the individual and his family, and not out of profits derived from the soil. Now, gentlemen, the next point to which I want to draw your attention is the moral responsibilities attached to the occupation of the soil. I have dwelt on the pecuniary question; and now I cannot divest my mind of the impression that the man who rushes into an arrangement with a landlord, bidding a price for land which every practical man feels that it cannot pay, without a due consideration of his moral responsibilities, is a bad citizen, and does a public injury. Now in the first place, the moral responsibility certainly includes the due payment of all the above-named burdens, so far as they fall to his share. The farmers of the country have, as a body, you perceive, become responsible for £135,000,000 per

annum; and they undertake tacitly either to employ, or to maintain, at the union workhouses, the whole of the population within the area of the parish or district in which they live. The law has said, "If you do not employ them the land must maintain them." Never forget the moral responsibility which thus rests upon the tenant, who, to a certain extent, though not entirely, supersedes the landlord. He takes the landlord's place; he undertakes, as it were, to maintain the population; he stands between the landlord and the labourer; and he has to bear all the fluctuations of seasons, the vicissitudes of the elements, the failure of crops, and the diseases among his cattle. Secondly, the farmers of the country have a direct interest in the moral welfare and habits of the labouring classes. The property of the farmer is always exposed to plunder and devastation, and he must come in contact with, and bear the brunt of, the bad passions of savage and dissatisfied labourers. Hence arise incendiarism, houghing and maiming of cattle, sheep stealing, and every species of petty larceny. The farmer cannot withdraw his capital on account of these things, and therefore he has a moral interest as well as a pecuniary one. Again, the peace and welfare of homes of farmers, and the happiness of their families, as well as the safety of their property, very much depend on the morals and conduct of their labourers. I wish that every occupier of land in this kingdom would duly reflect upon these things ere he ventures to become the tenant of a farm, and thus not only undertakes to pay annually very heavy burdens, but also partly to relieve the owner of the soil from this important dut as regards the labourers. And then, there is, further, the patriotic claim which your country has upon you for good cultivation. I have before pointed out the consequences which have resulted in other countries, and even in our own—for I can never consent to consider Ireland otherwise than as part of our own country (Hear, hear) —from the severities of famine; and I say it should be the pride, as well as the determination, of every true British agriculturist, while demanding justice for himself, to take care that no single individual in the community, and especially no class in society, sustains damage from his want of skill, industry, and integrity. You are bound to cultivate the soil for the benefit of the country, and to demand such conditions as will enable you to do so; and you ought to pause before you enter upon any undertaking which may ultimately turn to your own injury and to the injury of the community at large. I have often thought that farmers have not duly estimated the social importance of their position. I have often thought that if they were withdrawn as a middle class, the extremes of society, the upper and lower classes, might be brought into immediate collision (Hear, hear). They are, as it were, the bulwarks and safeguards of society (Hear, hear). I do not think, I repeat, that they consider this matter sufficiently; and I have introduced these remarks on moral responsibility, in order that I may state my conviction of the moral and social importance of tenant-farmers as a body. I hope they will not forget this, because the very sense of that importance ought to induce them to demand, in a firmer tone, justice for themselves. Now, I know it has been said—indeed, I myself have been told—that if the farmers, as a body, were to leave their farms, others would be found to take the places. An army of agents, it is said, would succeed them, and superintend the cultivation on behalf of their landowners. Now there are two questions which I have put in reference to this point, and to which I have never received an answer. The first is, Where is the capital to come from—the £300,000,000 necessary to put the soil into cultivation? And the next question is, Whether we have really reached that high moral position in society that the hireling, or the man who superintends for another, will feel as deep an interest in the management of a farm as the man who superintends for himself? I very greatly fear we have not; and I, for one, say that, until those questions have been satisfactorily answered, the social and moral importance of the farmers, as a body, will remain before me as a great truth (Hear, hear). Gentlemen, I come now to speak of the burdens levied upon fixed capital—the land. Now we can get on more clearly here, because we have authentic documents to guide us. The first and most prominent burden is the land-tax. The land-tax was first passed in 1690, in the fourth year of William III.; and at that time it was a property tax of 4s. in the pound on "the true yearly value of real property." It then produced £1,474,927, or more than one-fourth of the whole revenue. Now it was distinctly enacted that this tax should be levied *bonâ fide* on the growing value of all lands according to the full yearly value thereof. I want you particularly to mark this, because at that period the land-tax realised, as I have stated, more than one-fourth of the whole yearly revenue; and it was distinctly laid down, when the act was passed, that the tax should continue to be 4s. in the pound on the growing value of all lands in the kingdom. But this intent, we find, was frustrated by the passing of the 38th George III., in the year 1798, which fixed for ever the levying of the land-tax at the rate of the collection in 1690. Here, then, was an act of gross injustice. From that date to 1842 the land tax presents the fixed annual sum of £1,214,430; whereas all other taxes—as, for example, the customs and excise—have increased enormously. So much, then, for the land-tax. The next item is the income and property tax of 3 per cent. upon all yearly incomes, and paid alike by the tenantry upon an assumed profit; while all other classes pay upon the proved profits of their occupations or incomes. I suppose, if it were not for the assumption thus made, very little would be paid by many farmers (laughter). Now the property tax on land is estimated by Mr. Spackman as follows:—England £1,102,380, Wales £69,160; total £1,171,540. The next burden which is borne by landowners and the owners of fixed capital generally is that of the stamp duties. Landlords say, "Do not, for Heaven's sake, impose the legacy and probate duty upon us: we pay such very heavy stamp duties." I know many persons have swallowed that, and thought there was a great deal in it; but if you look into the stamp duty question, I think you will arrive at the same conclusion as I have

done, namely, that instead of landowners paying more, they actually pay less than others. I cannot, for the life of me, consider the stamp duty as a burden resting peculiarly upon landowners. I cannot agree that they pay more; nay, I am going to show you that they absolutely pay less than other classes of the community. I will take a specimen of the present stamp duties on bonds and mortgages. Above £50, and not exceeding £100, the duty is £1 10s.; so that you see the per-centage of duty upon the larger sum is just half that upon the smaller. £100, and not exceeding £200, duty £2; per-centage upon the lower sum £2, upon the higher £1. Above £500, and not exceeding £1,000, duty £5; per-centage upon the lower sum £1, upon the higher 10s. Above £1,000, and not exceeding £2,000, duty £6; per-centage upon the lower sum 12s., upon the higher 6s. 8d. So that there is 100 per cent. in favour of the higher sum upon all those modes of taxation; and, observe, the amount declines in a rapid ratio as the sum advances. Then again as regards receipts. If £10, and under £20, the duty is 6d.; per cent. upon the lower sum 5s., upon the higher 2s. 6d. If £20, and under £50, duty 1s.; per cent. upon the lower sum 5s., upon the higher 2s. If £50, and under £100, duty 1s. 6d.; per cent. upon the lower sum 3s., upon the higher 1s. 6d. If £100, and under £200, duty 2s. 6d.; per cent. upon the lower sum 2s. 6d., upon the higher 1s. 3d. If £500, and under £1,000, duty 7s. 6d.; per cent. upon the lower sum 1s. 6d., upon the higher 9d. If £1,000, and upwards, duty 10s.; per centage 1s. Here again there is a difference of 100 per cent. in favour of the higher amounts. You will agree with me that they have no reason to complain in that respect. Every one must admit that the larger class of stamps are chiefly required by the landowners; and therefore, instead of being aggrieved, it appears from what I have stated that the whole thing is in their favour. I next come to the legacy and probate duties. While all the floating, industrial, and personal property of the country is subject to these duties, lands and all freeholds are exempt. It cannot be said, then, that they are burdened under that head. As regards the stamp duties, which have always been said to press so unfairly on landowners, I hope you will all remember what I have brought before you, and be no longer misled. What I say upon the point is this: Let us have an equitable adjustment of all these matters; and if it shall appear that the landowners are at present aggrieved, I will answer for it on behalf of the farmers of this country, and the industrial classes generally, that they do not wish and will be no parties to any injustice. I will now give you a summary of the burdens pressing on the two descriptions of capital. The burdens on fixed capital were in 1842 as follows:—Land tax, £1,214,430; property tax, 3 per cent., £1,171,540; under the head of stamp duties there are exemptions, but no additional charge; legacy and probate duties, *nil*: total amount, £2,385,970. For the life of me I cannot discover any more burdens on the fixed capital in land. There may be mortgages, but with them we have nothing whatever to do. Now the annual burdens on floating capital were during the same period, in the form of rents, tithes, taxes, legacy and probate duties, &c., £53,179,432; losses on stock, labour, seed-corn, &c., £81,890,140: total amount, £135,069,572. Look on this picture and on that—the one showing the burdens on the fixed, and the other those on the floating, capital; and do not misunderstand this subject any more. I make no pretensions, as I said before, to critical accuracy; and I shall be delighted to be set right on any point on which I may have fallen into error. Let me now call your attention to one point of great importance; it is, that while the burdens on fixed capital are stationary in their nature, or at least not easily augmented, there is scarcely a single item under the head of floating capital which may not be increased. Rents may be increased, poor-rates may be increased, highway-rates may be increased, the casualties in stock may be increased; and I think no man could reflect upon the present season without being impressed with a conviction of the mutability and uncertainty of all human affairs, especially as regards agriculture. Recollect that to all these vicissitudes, fluctuations, losses, and casualties, the floating capital is peculiarly subjected. In calculating the value of property, it is usual for commercial men to consider the nature and character of what has to be estimated. If ships are to be insured at Lloyd's, it will depend upon the point of destination and the nature of the cargo what shall be the rate of insurance. If our worthy chairman were asked to insure your property, he would be sure to inquire whether you had any machinery; and, if there were increased risk, you would have to pay a greater premium. Now, I surely need not impress upon you that there is no property more exposed to contingencies, more liable to vicissitudes, than that of the tenant-farmer. The meanest labourer that you have upon your farms may apply a torch to your stacks; a hail-storm or an epidemic may visit you; a thousand evils may assail you unseen, and cut down the hopes of years in a single season. I want you to bear these things in mind, in order that you may arrive at the conclusion that I have done; and I ask you especially to remember that whatever may be the proportion existing between the burdens from fixed and those upon floating capital, while the burdens on fixed capital are stationary those on floating capital are liable to increase. It may not be uninteresting to inquire what proportion the burdens on land in this country bear to the burdens on land in other countries, and we should do this, if for no other reason, because it is impossible to be entirely exempt from the consequences of proceedings abroad. Let us learn a lesson of wisdom from those countries, and try to avoid the rocks on which they have split. Now I find from official returns made in 1842, that the taxes in France then stood as follows: Direct taxes on land, £15,812,184 8s; registration of acts and stamps, £9,235,300; total, £25,077,484 8s.; indirect taxes, £20,762,641 5s. 7d. So that the total budget for France in that year was £45,840,125 13s. 7d. The amount borne by the land, you will recollect was more than half the entire taxation of the country. In Russia, in the same year, the land and property-tax was £3,990,000, other taxes £3,667,000. The land,

therefore, in Russia also paid more than half the entire amount. In another despotic state, Austria, the land and property-tax amounted to £8,795,000, the other taxes to £7,700,000. In England, in the same year, the direct taxation amounted to £1,214,430, and all other taxes to £51,034,164. The £51,000,000 have been thus divided: Taxes on food, drinkables, articles of clothing, &c., and raw materials, £39,034,164; transfer of personal property (not land) on produce and popular industry, £7,000,000; stamps, mercantile affairs, medicines, assessed taxes, &c., £5,000,000. Now I maintain that not only are the direct taxes on the fixed capital of the land in this country less than those upon the floating capital, but that they are less than those levied in any other state in Europe: and it is my firm belief that there is no other European population which could have borne the amount of industrial taxes which has been levied in England. Now, gentlemen, when you see the population of France breaking out into revolution, which I hope will never be the case in England, I call upon you as farmers to think of all these matters—to take care that your labourers have no just cause of complaint, and that the whole taxation of the country is equitably adjusted. There is one other point to which I must call your attention before I conclude. I want you as farmers to take your own case more into consideration. I have shown you some of the liabilities to which you are subject; I now want you to see what is the annual produce of the soil, in order that you may know whether the two ends meet, lest, as tradesmen sometimes say at Christmas, the balance should be on the wrong side. The total annual value of the agricultural produce of England and Wales (exclusive of wood, gardens, and hop plantations) has been estimated by Mr. M'Culloch, with wheat at 50s. per qr., barley at 30s., and oats at 25s., at £130,250,000. Now let us take the other side. I have shown you that rent, tithes, and taxation amount to £53,179,432; labour, losses on stock, &c., to £81,890,140; making a total of £135,069,572. Now if these calculations be correct, there is an annual loss sustained by the tenant farmers of £4,819,572. Remember, too, I have mentioned nothing for the game, and nothing under the heads of agency, and want of security. I leave them to your own mature consideration. It is not easy to estimate; but I think it cannot be supposed that the whole loss of capital sustained by farmers in bad years is less than about £10,000,000. I do not wish, however, to bind myself to any particular sum. I think we may safely come to the conclusion, then, that there is a very considerable loss sustained by the floating capital of tenant farmers. If this be not the case, how is it that so many farmers have sunk down from the position they once held, and are now to be found in a state of dependence if not actually living in union-houses? Aye, and this is a loss which legislative wisdom would under any circumstances be some time in retrieving. There seems to be a crotchet in this country with respect to the profitable cultivation of land, to which I cannot help here adverting. I once knew a very busy gentleman, who ventured to tell tenant farmers that he thought very little of farm-yard manure, for that he expected, by the aid of science and of the moon, to be able to show how every farmer could carry manure enough in his waistcoat pocket to answer all the purposes of agriculture (Hear, hear, and laughter). Many farmers caught at that crotchet. What is really wanted, however, is greater security, in order that the tenantry may be able to cultivate the land profitably and to feed the people. I am sorry to say that tenants are too apt to catch at every idea but the right one. Gentlemen, I have thus imperfectly pointed out to you some of the most prominent burdens on fixed and on floating capital; I have alluded also to those moral responsibilities which I can never consent to separate from the occupation of the soil; I have shown you the proportion between the taxes paid by fixed capital here and in other countries; and I do hope that you will seriously consider these things, and endeavour, to the best of your ability, to get a right and sound judgment. I have shown you that, while the occupiers of the land pay £135,000,000 per annum, and are subject also to a great number of contingencies, the owners of land pay little more in the shape of direct taxation than £2,250,000, which amount is paid on a rental of £40,000,000—a rental which continues, whether your crops fail or not. I am afraid that many farmers think nothing of these things. Let us, in future, fairly estimate our moral responsibilities, and determine that no man shall be misled either by our influence or for want of our good advice. I have now to apologise for having so long occupied your time. I thank you for the kindness with which you have listened to me, and I hope you will favour me further by giving to the subject which I have submitted to your consideration a full and impartial examination (cheers).

Mr. HARVEY said: Sir, I do not rise in the hope of throwing light on this subject, but rather of enabling gentlemen who may express their opinions to come to a more speedy conclusion. When I first saw the question on the card, I certainly thought that the Farmers' Club had undertaken to deal with a very wide question; but, after giving the matter some consideration, I felt that the question was a very narrow one, and that a very few facts would settle it. After hearing Mr. Latimore this evening, I am again forced to the conclusion that the question is very wide (laughter)—that is, if he be correct in considering as burdens on land the various things which he has introduced. It strikes me that he has referred too much to contracts on land instead of burdens (Hear, hear). I take it that contracts must be fixed charges, of which we cannot get rid; and I regret that Mr. Latimore did not confine himself more to what may fairly be regarded as burdens, and burdens capable of being removed. If Mr. Latimore be right in all that he has advanced, the tenantry have indeed a frightful amount to pay. He has, in fact, proved too much; he has shown that the tenant farmers have to pay £135,000,000 out of £130,000,000 received by them (Hear, hear). The real question is, however, whether contracts are to be regarded as burdens on floating capital.

Mr. W. Bennett rose and said that he fully agreed with Mr. Harvey that Mr. Latimore had greatly overshot the mark, and that in attempting to prove too much he had failed to carry with him the sympathy or good sense of the meeting. That gentleman had certainly furnished some statistical returns of the quantity of land in cultivation in England and Wales, with the probable amount of capital employed in agriculture, which, if quite correct, may be serviceable to the community; and he has also scraped together a very large accumulation of burdens (so called) as being borne by the occupiers rather than the owners of land. But it had been very properly observed by Mr. Harvey that a very large portion of those burdens were mere matters of contract between the owner and occupier. And if Mr. Latimore's object is to show the existence of unequal taxation, he had taken sure enough a very confused mode of establishing his position, because it must be clear as the sun at noon-day that the owner of the soil virtually bears those burdens, although in the first instance the tenant may make the payment. In common fairness let me only ask any member of this club whether he supposes, in case the tenant had nothing to pay in addition to his rent, any landlord would let land at from 20s. to 30s. per acre, which by cultivation would sometimes yield a produce worth ten pounds. But he must say that he thought Mr. Latimore's attack upon the stewards and land agents of the country displays an equal want of good taste and fairness. There are doubtless bad stewards as well as bad men in all the other departments of life; and he (Mr. Bennett) was happy to know that there are very many good men and true in those stations. What, however, seemed still more preposterous was to charge the maintenance of these four or five thousand men upon the tenantry of the country. With just as much propriety the argument would hold as respects the merchant or manufacturer, whose business required him to employ agents in carrying it on. But most of all he disliked the general strain of Mr. Latimore's address, as bearing upon the landlords of this country, intimating that as a body they have no sympathy with the middle and lower classes; for himself he did not believe it, and he trusted this club would never subscribe to any such sentiments (loud cheers, in which the voice of Mr. Lamb, a landowner, was distinctly heard). This club would lose the respect of the country if it gave countenance to such sentiments; besides, they are not founded in fact. Who is there (continued Mr. Bennett) in this meeting who would not prefer farming under the aristocracy and ancient landowners of the kingdom rather than under gentlemen who have saved their fortunes from trade and commerce? These are always pounds, shillings, and pence gentlemen, and, in making an investment, will work the question of interest to the greatest nicety; whereas he knew at the present moment where the aristocracy were erecting commodious cottages, which with their gardens will not produce 2 per cent. for the outlay (cheers). If Mr. Latimore had confined himself to the fact that an immense large capital is employed by the tenantry of the country for which they have not sufficient security, and that taxation requires general revision, he doubted not but the members of this club would have fully sympathized in those sentiments (cries of "Hear, hear.") He accounted, however, for Mr. Latimore's indulging in these democratic sentiments from the company he keeps, and in which he has lately so much delighted (great laughter). He hardly need say he meant the Anti-Corn-Law League (cheers). It was certainly no uncommon thing there to see the landlords as a body held up to odium, but he greatly mistook if that sort of thing would find favour with the London Farmers' Club (loud cries of "Hear, hear" from Mr. Pain.) He would not, however, at that late period of the evening wade through the whole of Mr. Latimore's lengthy remarks; but he could not pass over in silence some of his concluding observations, in which, to show that in other countries the landowners bear a much greater share of the burdens of the state than in England, he instanced France in particular. Surely a worse example could not have been selected. Now, what is the club to gather from this? Why, if it means any thing, it means that while in England the wealthier classes have thrown all the burden upon the middle and lower classes, in France for a series of years the higher circles of society have borne the burden more fairly. And yet it is an indisputable fact that in France you have anarchy and confusion, while in England you have peace (loud cheers). If Mr. Latimore had wished to prove the inverse of his proposition, he could hardly have chosen a better illustration; but the truth is this, gentlemen—throughout he has this evening given us another striking exemplification of the old maxim, that by attempting to prove too much, you prove just nothing at all (cheers).

Mr. I. Smith, Rye, said: I beg to thank Mr. Latimore for what he has said; and as regards any item which may be objected to as a burden, it must at all events be admitted as a grievance. I did not hear any observation from him which could tend, in my opinion, to set landlord and tenant at variance, and I feel confident that he had no such wish. All that he wants us to do is seriously to consider our responsibilities, and to place ourselves, if possible, in the right position. It is clear that, as the producing class, we have heavier burdens to bear than we ought to have. I quite agree with the gentleman who has just spoken—that our floating capital is very inadequately protected; and I do think it behoves us all to unite for the protection of that capital.

Mr. Wyatt said,—Sir, Mr. Latimore appears to me to have taken—to say the least—a careless view of this subject. I would ask him this question, Whether all the taxes and all the charges and expenses of this country are paid out of the floating or producing capital? He ought certainly to have taken a wider range than he has done. He ought to have said, If the land be taxed, the tax comes out of the floating capital of the country. I think it must be obvious to every person who takes a practical view of this subject, that one portion is paid by one party and another portion by the other party. A charge which is paid by the tenant, in any particular form, is the measure of the additional rent which he would otherwise have to pay, were there no such charge upon his capital. Suppose, for example,

I pay £400 a-year altogether—£200 for rent and £200 for other charges—and you reduce the amount by £50, the question really is, how much, in such a case, will the landlord take, and how much will the tenant take? I do do not know in what other light you can deal with the matter. It is for the interest both of landlord and tenant that such a question should be fairly discussed, and that no one-sided or prejudiced view should be taken by either party.

Mr. Beadel said,—Sir, I should this evening have remained perfectly quiet, had not our excellent friend Mr. Latimore indulged in some remarks which justify me in rising. I rise to defend what he calls that useful class of red-tape gentlemen—land-agents and land-valuers. How he could include the charges of land-agents, valuers, and gamekeepers—for he classed us altogether (laughter)—amongst the charges which fall upon the tenant—I am certainly at a loss to conceive. I will not remark upon the spirit and temper in which it appeared to me his observations were made. I am willing to suppose that he had no intention to offer an insult to a useful and valuable class of men; but, as one of the body—and with no pretension to being the deepest-dyed piece of red tape to be found—I cannot allow those observations to pass, in a company like the present, without saying that I know, of my own personal knowledge—and I am quite sure that there are many gentlemen in this room who can give similar testimony—that amongst that class there are many men who are as honourable, as intelligent, and as useful members of society as Mr. Latimore himself—the best tenant-farmer in the world (Hear, hear, and laughter.) Thus much I felt it my duty to say in defence of the class to which I belong. It has sometimes been my pleasant duty to interpose between the unreasonable demands of a landlord and the unreasonable requests of a tenant, and to do what I conceived to be right and just between two classes who seem to me occasionally to require some person to come between them. I will now allude to one or two points on which Mr. Latimore has allowed his grey mare to carry him too fast. He appeared to me determined to make out a case, and in his effort to do so he seems not to have sufficiently considered what he was advancing. I find that he takes half the rental as the amount of the property-tax paid by the tenant. Now he must know perfectly well that all tenants who pay less than £300 a-year are entirely exempt from that tax. That is one item, at all events, which needs some correction. Another point, in introducing which he spoke in a very complimentary way of auctioneers, had reference to the sale of stock upon a farm. After ten years' occupation, he says, the depreciation upon stock is 7½ per cent. So that, according to him, at the end of the period a tenant who bought new implements when entering on his occupancy would have only 25 per cent. left; and remember, Mr. Latimore distinctly stated that he charged interest of capital in addition to the value of these things. Now I would put it to the experience of any gentleman present whether the depreciation is anything like what has been stated. I have had a good deal to do with such matters, and I believe that the allowance commonly made within my experience is 3½ per cent.

Mr. Latimore: I make no positive statement with respect to ten years. I give only the annual loss.

Mr. Beadel: This is a matter which often comes under the attention of valuers, and 3½ per cent. is the amount which has been generally allowed so far as I can remember. There was one general statement at the conclusion of Mr. Latimore's address which seems to me to bear out the remark made by Mr. Bennett—namely, that in endeavouring to make a good case he had made one a little too good. Not content with shewing a loss of £4,819,572, he said there were a great many things which he had not taken into account, and that, in fact, there could be no doubt that the annual loss of capital sustained by the tenant-farmers of this kingdom was £10,000,000. Now that may be true—I cannot say positively that it is not; but this I will say, that if it be true, it is a most surprising thing that we do not see more of the effects of such a loss at the present moment. I must confess, which indeed I have stated before, that if you take farmers as a class, non-success is the exception and not the rule; and I hope that this will continue to be the case for many years to come (Hear, hear). I cannot hear a general statement that farmers, as a body, are proceeding in their business at an annual loss of £10,000,000 without saying that, so far as my own experience goes, it would lead me to give a contradiction to such a statement.

Mr. Cheffins said—I would request Mr. Latimore, when he next reviews the charges laid upon fixed capital, to take into consideration the important item of repairs (Hear, hear). Every gentleman present must be fully sensible that that is in fact an important part of the question. We all know that repairs are generally left to landlords; and if we consider the equivalent of money, homesteads, and other buildings, we cannot but feel that this is a heavy liability. I do not pretend to give any estimate of the amount, but at least it ought not to be forgotten in dealing with such a subject as the present.

Mr. Hutley: In that part of the country in which I live, the landlord finds materials, and the tenant labour.

Mr. Latimore, in reply, said he was sorry to be under the necessity of defending himself against misunderstanding. It appeared as though some gentlemen were determined to misunderstand him. He had stated distinctly that in cases where land was occupied by the owner he must pay the burdens which would otherwise fall on the tenant. He could not, therefore, be accused of having made an invidious distinction. He had certainly said nothing about contracts, but he still maintained that the burdens which he had mentioned were borne by the tenant. Objection had been taken to his estimate of 7½ per cent. for annual losses upon stock. He still believed, however, in the correctness of that estimate; and any man who came to the consideration of the question before the meeting, with a determination to sift it to the bottom, would, he thought, come to the same conclusion. The question really was, whether it would not be better for

the tenant if, when he entered on the occupation of a farm, he always knew precisely what burdens he would have to bear, instead of making a bargain in the dark (Hear, hear). There could be no permanent benefit from ignorance on such a subject, nor could the tenant, whilst it continued, perform his duty either to himself or to his country. Mr. Beadel had thought proper to make a personal allusion to himself: he (Mr. Latimore) had spoken of systems, not of men (Hear, hear); he had, in fact, abstained from making any charge on account of land-agents and landowners.

Mr. Beadel: You gave £5,800.

Mr. Latimore: 5,800 persons engaged in those callings. He was surprised that Mr. Beadel should rate his own class so low as £1 per head. With regard to his estimate of 7½ per cent. for wear and tear of stock, he had taken pains to show that his estimate had reference to the working cattle, such as horses and oxen, and to agricultural implements in daily use. He did not include such stock as cows and calves, because it was to be hoped that they would generally improve in value. If any person on taking a farm purchased new implements and a certain number of horses and oxen, and had an auction at the end of ten years, he would discover that 7½ per cent. per annum was not too great an allowance under the head of loss. He had conversed with several gentlemen on that subject, all of whom were of opinion that even 10 per cent. was little enough to set down for decline of value. At all events, he was prepared to maintain that the annual depresssion in the value of such live and dead stock as he had mentioned was not less than 7½ per cent. Now he had been told that he had taken both too wide and too narrow a view of the question before the club. It was very difficult to be right, but his object had certainly been to take a sufficiently broad basis, and he hoped all the farmers of this country would do the same. One gentleman had told him that he ought not to forget that the landlord had to pay for repairs. Happening to be a farmer himself, he was under agreement to keep up the repairs; and, were he disposed to forget that circumstance, those whom he employed would not allow him to do so. Within the last three years he had paid 50 per cent. on the rental for repairs. He would remind gentlemen who objected to his argument, that the law compelled a man to keep what he occupied in good repair: the law protected the landlord against loss from dilapidation.

Mr. Beadel thought Mr. Latimore could not but be aware that in nine cases out of ten the materials for repairs were found by the landlord.

Mr. Latimore continued: He knew something of that matter. He had known cases in which the tenant had been obliged to fetch stone from a distance of seven miles; and when such was frequently the case, though he would be very happy to make any alteration on either side if it were justified, he thought the utmost that he could be expected to say in favour of the landlord was that the burden was equally divided. With respect to the income-tax, he admitted that there were certain exemptions; but then, on the other hand, he contended that the operation of the law was such that many persons had in reality to pay the tax who would escape if they did not occupy the position of tenants.

A Member: You must divide your 7½ per cent. by 2.

Mr. Latimore was very happy to listen to any one's opinion; but he certainly could not accede to the suggestion thus made.

Mr. Payne had certainly no hesitation in saying that 4 per cent. was quite enough.

Mr. Latimore said he had taken pains to ascertain what allowance was made in cases in which land was farmed by agents, when everything was reduced to figures; and he found that 10 per cent. was the sum always allowed.

Mr. Beadel said that sum must include interest on capital, which Mr. Latimore had excluded from his calculation.

Mr. Latimore said it seemed as if he must be misunderstood. There was a certain amount of floating capital employed on every farm in the kingdom; for horses, implements of husbandry, &c. Horses would grow old, ploughs and harrows would wear out; and he had set down the loss at 7½ per cent., because he found that no practical man in his own district would admit that it was less.

Mr. Payne: I have expressed the opinion that it does not exceed four.

Mr. Latimore felt quite confident that if Mr. Payne would open an insurance office, and insure that portion of the farmer's capital on the basis of a loss of only 4 per cent., he would immediately have a great many customers. That, after all, was the best test. In conclusion, he felt great pleasure in moving the following resolution:—

"Resolution.—It is the opinion of this meeting that the pecuniary burdens and moral responsibilities incumbent upon the floating capital of the occupiers of land in England and Wales are very onerous in conjunction with a precarious and uncertain tenure, and exceed those borne by the fixed capital of the landowners; and they earnestly recommend a due consideration thereof to every landowner and tenant-farmer in the kingdom, in order that they may clearly understand their mutual position, and be thus better qualified to perform their relative duties, to the promotion of their mutual interests, and the prosperity of the community at large."

Mr. W. F. Hobbs: Sir, I beg to second the resolution, and I will tell you why I do so. The committee of this Club have thought that the burdens resting on the fixed and floating capital invested in the soil formed a subject worthy of our consideration, and it was decided that that subject should be introduced. The resolution proposed by Mr. Latimore is one which will, I think, meet with the concurrence of the members of this Club (Hear, hear). In seconding this resolution, be it observed, I do not tie myself down to all Mr. Latimore has advanced (Hear, hear); I do not bind myself to all the conclusions at which he has arrived; nor do I give any opinion as to whether those elaborate calculations which he has at a very great deal of trouble, and I have no doubt by much sacrifice of time, brought before us, are or are not correct. But I do think that having admitted that the burdens upon fixed capital and those upon floating capital

in the land are worthy of consideration, we have a right and are bound to call the attention of landlords and practical farmers to this subject, especially as it appears from what Mr. Latimore and other gentlemen have said this evening, that these two classes are generally very ignorant of their true position as regards such burdens (Hear, hear). Therefore, expressly stating that I do not bind myself to any views which have been expressed by Mr. Latimore this evening, I beg to second the resolution which that gentleman has proposed.

The CHAIRMAN said: Gentlemen, after the elaborate address which our friend Mr. Latimore has made on the question now under discussion, and amongst so many practical men competent to deal with it, not only from their daily avocations and the capital they have invested in the soil, but from the attention which they bestow and the intelligence which they bring to bear on a subject so important to their own interests; involving a mass of details which require not only particular accuracy, but actual experience to vouch for and to comprehend them; it would be improper in me to offer any lengthened remarks upon what has taken place. Nevertheless, I cannot permit the discussion to pass over or submit this resolution to you without making one or two observations (Hear, hear). I must confess that, having paid the greatest possible attention to what has fallen from my friend Mr. Latimore, I cannot concur in the principle on which he seeks to arrive at a conclusion this evening (Hear, hear). I do think—whether I am right or not in taking this view it will be for you to judge—I do think that he does not draw a sufficient distinction between what may really be considered burdens upon land, and what must be regarded as losses and contingencies connected with farming as an occupation, and to which, though in other forms, capital embarked in any other pursuit is equally liable (cheers). I think that is the great point in which our friend has failed in the course of argument which he has pursued. I did expect that we should have had our attention directed simply to the specific burdens which attach to the land itself—to fixed capital of the landowner, and to the floating capital of the farmer—burdens over which they have no control, the imposition of which might have been imputed to a power described as omnipotent, but of the injustice of which they might have a right to complain. The loss of capital by disease in stock, the loss by wear and tear of implements, and the loss which may be occasioned by a hailstorm, are no more than those to which the merchant is liable in connection with the ship he sends to sea. In the latter case there is a wear and tear, there is a liability to suffer by storm, just as the crop is exposed to the hailstorm. The annual per centage of loss by wear and tear, though it may not be the same in amount, is of like character (Hear, hear). Therefore I do not see how it is possible to treat all the matters which have been introduced by Mr. Latimore as burdens upon land. I, for one, could not give my concurrence to the resolution which has been proposed, and my reason for not being able to do so is furnished to me by my friend Mr. Hobbs. Mr. Hobbs has fairly and properly stated, in the candid manner that he always does, that he was desirous that the resolution should be discussed, and therefore he seconded it; but he very cautiously guarded himself by saying in effect, "In doing so, I wish it to be clearly understood that I do not hold myself bound by all the conclusions at which Mr. Latimore has arrived." Now that is precisely the ground upon which I cannot concur in this proposition. I must confess that I do not agree to the data which Mr. Latimore has started with, hence I cannot admit his conclusions. It may be that other gentlemen are of opinion that he has proved this evening that the burdens upon floating capital are onerous. I must confess that if I compare them with the burdens upon fixed capital I cannot say they are more onerous, because from anything that has been advanced this evening I cannot draw a line between the one and the other. For this reason I could not concur with Mr. Latimore in his resolution, although I might concur in its spirit; and I would suggest to him that it should be modified. I perfectly agree with Mr. Hobbs in his remarks as to the importance which the committee have attached to the discussion of this question. The committee deemed it, in fact, one of the most important questions which had ever come under their consideration, and were much gratified in placing it upon the card for discussion. I think, therefore, that the question ought to be especially noticed, that we ought to mark our consideration of it, at the same time avoiding, as I think we ought to do, the committing ourselves to conclusions which I feel persuaded any person who may read the discussion of this evening would not consider warranted. I would, therefore, suggest that the resolution should be couched in this form—

"That this meeting earnestly recommends a due consideration of the pecuniary burdens and moral responsibilities incumbent upon the floating capital of the occupiers of land in England and Wales to every landowner and tenant farmer in this kingdom, in order that they may clearly understand their true position, and be thus better qualified to perform their relative duties, to the promotion of their mutual interests and the prosperity of the community at large."

That resolution does not, you observe, pledge us to any particular conclusion on the present discussion, but leaves the subject open for further consideration.

Mr. LATIMORE: It appears to me that there is very little difference.

The CHAIRMAN: There may be very little difference, but, in my judgment, it is all the difference. The resolution which I have just read does not commit us to the conclusion that the burdens upon the floating capital have been proved to-night to be onerous; omitting altogether the comparison to fixed capital.

Mr. HOBBS: As to the point upon which you differ from me, sir, I cannot flinch one iota. I think the burdens on the floating capital are onerous, and are daily becoming more so. We see new gaols and various other public buildings being erected in different counties, for which the tenant will have to pay. We see the rural police, and various other local and district burdens, introduced among us; and I think, therefore, that every practical man in this country will agree with me that

the burdens on the floating capital are onerous. That is the point which I stand upon. I really thought we were all willing to admit that the burdens resting upon the floating capital of the tenant farmer are onerous. We are calling for a reduction of poor's rates and various local burdens, and yet it is now proposed to declare that it is the opinion of this club that the burdens to which tenants are subject are not onerous.

The CHAIRMAN: One word in explanation. If Mr. Hobbs is prepared to put the question fairly before you, I am perfectly prepared to meet it; but I, for one, will not be a party to anything being carried, however true it may be, by a sort of side wind, and not upon the question before us. If Mr. Latimore and Mr. Hobbs will put the question upon this ground, that the burdens upon floating capital are more onerous in proportion than those upon fixed capital, he will then put it fairly; but when the object was to institute a comparison between the two, and that comparison has been altogether avoided, the conclusion sought to be arrived at being that the burdens upon floating capital are onerous, altogether blinking the comparison between the two classes of burdens, I repeat I will not be a party to any such conclusion. If the question be put fairly, we shall have an issue to try, and then the meeting may determine whether it has been shown to-night that the burdens upon floating capital are more onerous than those upon fixed capital (Hear, hear). Mark, I do not say that they are not; all I say is, that the arguments you have heard to-night do not warrant you in coming to the conclusion that they are, and that no man, on reading this discussion, will say that the arguments warrant such a result.

Mr. LATIMORE said: Gentlemen, I have been asked by Mr. Shaw to withdraw this resolution, and to substitute for it his own proposition. Now, with every desire to promote harmony in this meeting, I could never consent to do what I believe would be a dereliction of duty and a sacrifice of principle; while, at the same time, it would be a failure of duty on my part in reference to the farmers' club, and to farmers generally. If there were anything offensive in the mere terms of the resolution, I would withdraw it; but how can I flinch from the assertion, that these burdens are onerous when we daily hear such loud complaints with regard to them? It would be saying to the landlords, "We have nothing to complain of," and I hope that gentlemen who take that position will never again complain of unjust taxation. To get rid of the discussion by denying that the burdens on floating capital are exceedingly onerous, is what I never can consent to.

Mr. HARVEY observed that the observations and object of the mover and seconder were beside the question before the meeting. If Mr. Latimore persevered with his resolution, he should certainly feel it to be his duty to oppose it, though he entertained no objection to the resolution proposed by the Chairman.

Mr. BEADEL said as he certainly could not admit that it had been proved that the burdens on the floating capital of tenant farmers were more onerous than those on the fixed capital, he must move the following amendment:—

"That the discussion this evening will not justify the meeting in stating that the burdens upon the floating capital of the land are more onerous than the burdens upon the fixed capital."

Mr. HARVEY seconded the amendment, which, on being put to the meeting, was rejected, three hands only being held up in favour of it.

Mr. BEADEL then expressed a wish to second the Chairman's amendment; but it was considered that as he had not done so before his own was put, it was not then open to him to take that course.

Mr. LATIMORE's resolution was then carried.

On the motion of Mr. Latimore, a vote of thanks was given to the Chairman.

The CHAIRMAN, after acknowledging the compliment, observed, that his object in proposing his amendment was to prevent the club from committing itself on the question with the country at large. He certainly did feel that on one or two similar occasions he had succeeded in his object. The conclusion to which the meeting had come to night might, perhaps, be a sound one; but he must repeat his conviction that no man who may read the discussion in print will consider it justified by the evidence which had been brought forward.

The meeting then separated.

Our readers will find in another part of this paper a full report of the discussion at the Monthly Meeting of the London Farmers' Club on Monday last. The subject, which was introduced by Mr. Latimore, was, "An inquiry as to the relative proportions of Burdens borne by the Fixed Capital, compared to those borne by the Floating Capital in Land." The difference of opinion upon the conclusion arrived at, and the resolution adopted, was much more decided than we recollect upon any former occasion. It will be seen that Mr. Lattimore, in his introductory remarks, described the question as a "most important one;" and certainly, in proportion as it may be important, so is it of consequence that it should be stated accurately, discussed impartially, and decided soundly. In explanation of the course which he proposed to adopt in discussing this question, Mr. Latimore observed—

"In enumerating the payments made by the floating capital, a distinction must always be made *between taxation and current expenses;* but, in order to grapple with the question, it is necessary to depict the whole expenditure (under whatever heads) and the probable annual returns, in order that, by striking a balance, something like a sound conclusion may be attained as to the aggregate profit or loss, and the *proportions* of the burdens to which either description of capital in land (fixed or floating) is annually subjected."

Mr. Latimore divides the obligations of the occupiers of the soil into two parts, namely, moral obligations and pecuniary obligations, and then says—

"In treating of the pecuniary burdens I propose to consider, first, those which fall upon the floating or industrial capital of the occupiers of the soil, and which I place in this order because they form the larger proportion; and, secondly, such as are chargeable upon the fixed capital—the land."

The following are the items, with their respective amounts, which are enumerated by Mr. L. as burdens upon "the floating or industrial capital of the occupiers of the soil." The scope of the question is restricted to England and Wales—

	£
Rent	40,167,089
Poor and County-rates (1842)	3,064,548
Highway-rates	511,236
Church-rates	224,752
Turnpike-trusts	626,037
Tithes	3,500,000
Income-tax	585,770
Excise duty on malt and hops	2,500,000
Legacy and Probate duties	1,500,000
Increase on poor-rates since 1842—date of previous amount given	500,000
Agricultural labour	40,000,000
Mechanical labour, as blacksmiths, wheelwrights, carpenters, &c., &c.	3,200,000
Losses on live stock, 7½ per cent.	8,192,140
Wear and tear of implements, 7½ per cent.	8,998,000
Seed-corn, grasses, turnip-seed, &c.	10,000,000
Interest upon capital estimated at £230,000,000	11,500,000
Total	£135,069,572

Further burdens enumerated, but on which no amount is put—	
Game	
Land-agents, numbering, as stated by Mr. Spackman	174
Land-stewards, do., do.	4,829
Gamekeepers, do., do.	439

These are the several charges which constitute the burdens upon the floating capital.

The burdens upon the fixed capital are stated to be as follows:

	£
Land-tax	1,214,430
Property-tax	1,171,540
Total	£2,385,970

The account, therefore, stands, according to Mr. Lattimore's view—

	£
Burdens on floating capital	135,069,572
Burdens on fixed capital	2,385,970
Excess paid by floating capital	132,683,602

Mr. Latimore places the subject in another point of view.

Taking the value of agricultural produce as estimated by Mr. M'Culloch, at £130,250,000, it will be seen that it is not sufficient to pay the burdens above-enumerated by £4,819,572.

Adding to this some small amounts omitted, Mr. Lattimore comes to the conclusion—

"That the whole annual loss of capital sustained by farmers is not less than about £10,000,000."

We shall offer no other remarks on the character of the items which are enumerated as constituting burdens upon the floating capital of the occupier of land, than that of saying that Mr. Latimore wholly deviated from the position which he assumed at starting, namely, that "a distinction must always be made between *taxation and current expenses*." As regards the burdens upon fixed capital, we consider his statement equally one-sided. We confess ourselves wholly unable to comprehend how the opinion expressed in the resolution passed at the termination of the discussion could have been arrived at from such data. Mr. Latimore seems enamoured with the system adopted in France, in Russia, and—as he terms her—in "despotic Austria."

"It may not be uninteresting to inquire what proportion the burdens on land in this country bear to the burdens on land in other countries, and we should do this, if for no other reason, because it is impossible to be entirely exempt from the consequences of proceedings abroad. Let us learn a lesson of wisdom from those countries, and try to avoid the rocks on which they have split. Now I find from official returns made in 1842, that the taxes in France then stood as follows:—Direct taxes on land, £15,842,184 8s.; registration of acts and stamps, £9,235,300; total, £25,077,484 8s.; indirect taxes, £20,762,641 5s. 7d. So that the total budget for France in that year was £45,840,125 13s. 7d. The amount borne by the land, you will recollect, was more than half the entire taxation of the country. In Russia, in the same year, the land and property-tax was £3,990,000, other taxes £3,667,000. The land, therefore, in Russia also paid more than half the entire amount. In another despotic state, Austria, the land and property-tax amounted to £8,795,000, the other taxes to £7,700,000. In England, in the same year, the direct taxation amounted to £1,214,430, and all other taxes £51,034,164. The £51,000,000 have been thus divided:—Taxes on food, drinkables, articles of clothing, &c., and raw materials, £39,034,164; transfer of personal property (not land) on produce and popular industry, £7,000,000; stamps, mercantile affairs, medicines, assessed taxes, &c., £5,000,000. Now, I am certain that not only are the direct taxes on the fixed capital of the land in this country less than those upon the floating capital, but that they are less than those levied in any other state in Europe."

The following remarks of Mr. M'Culloch, in his work on taxation, having reference to the taxes on land in France, may not be deemed inappropriate:

"So little, indeed, do we know of the mode in which the public revenue is raised in France, that a notion seems to be generally entertained, that it is principally derived from the land, and that a very large proportion of the territorial produce of the country is appropriated by government. Nothing, however, can be more completely unfounded than such a notion; and how much soever it may be at variance with the popular opinion on the subject, it is certain that, including tithes, poor-rates, and other county rates, the land of England is twice as heavily taxed as that of France."

The same author comments on the policy of heavily taxing the land in England in the following terms:—

"The landlords have long stood, in respect of taxation, on the same footing as the rest of the community; and can with justice be subjected to such taxes only as are laid on merchants, manufacturers, and other capitalists. It is obvious, therefore, that all projects for laying peculiar burdens on the land, however varnished or disguised, should no longer be looked upon as projects for the imposition of equitable taxes, but for the confiscation of a portion of the property of the landlords! If such flagitious schemes be ever entertained, they will form a precedent that will justify the repudiation of the public debt, and the subversion of every right."
—Mark Lane Express of the 8th ult.

PURE VEGETABLE AGRICULTURE.

GREEN MANURE INSTEAD OF DUNG.

TO THE EDITOR.

SIR,—Without disputing the general rule laid down by some of our leading agriculturists, that a well-farmed estate ought to maintain itself in fertility, by keeping cattle enough to supply the land with manure, it may be not less worth consideration whether land, in this densely-peopled country, may not be better employed in feeding men than beasts; and how far butcher meat, rather than grain and other vegetables, may form the subject of import from less populous regions.

If the soil can keep itself in heart as well by green manure as by dung, it can certainly produce much more human food, directly, in the vegetable state, than ultimately as butcher meat, resulting from its consumption by cattle.

Thus, according to Professor Low (2nd edition, p. 632), one ton of turnips produces 14lbs. of beef; and though, in our warmer climate, the average may be nearer 16lbs., yet if, including mutton, we take it as high as 20lbs.—that is, 1lb. of meat per cwt.—still, as this cwt. of turnips contains 11lbs. of solid food, the flesh is only 1-11th of the solid matter of the turnips, and this flesh itself is nearly ¾ water. Or, if we average the proteine compounds in turnips at 2 per cent., and in flesh at 25 (which is a little above the mean), the 2lbs. of the proteine in 100lbs. of turnips will give less than ¼ of the same in flesh meat. These averages are from Johnstone, who is not satisfied with them; and others have appeared since, still more in favour of the vegetable. But not to encumber your columns with needless comparisons and repetitions, we may take Mr. Lawes's results, as carefully attained, on the large scale, and even less in favour of our argument than Johnstone's. According to Mr. Lawes (*Royal Agricultural Journal*, vol. 8, p. 255), 5-6ths of the nitrogenous proteine, or fleshening matter, in the food of cattle goes to the dung, only about 1-6th remaining in the flesh of the animal; and of the carbonaceous, or fattening portion, this difference is still greater; consequently the produce of one acre, consumed *directly* as vegetable food, will feed full as many people as that of six acres converted into beef and mutton—a consideration of some weight in a country where the soil does not produce enough for the population.

But we must have animal food. Certainly; and why not import that wherein we have the produce of six acres concentrated into one, instead of corn and other vegetable matters now imported? Not as live cattle, which must be limited, and is costly; but the meat packed and *lightly* salted, so as not to draw out the juices and harden the fibre; but only in proportion to the length of voyage, allowing it time to mature or become tender for the market, retaining its juices and flavour. This is surely within the reach of chemistry. Still a large proportion of our butchers' meat will always be home-fed: the question is, how large?

KEEPING THE LAND IN HEART, WITHOUT DUNG.

But next, how, without cattle dung, is an estate to be kept in heart? This may not prove so great a difficulty as is supposed. Dung supplies the land with organic matter to feed the plant by the roots; the inorganic vegetable salts, and ammonia, to stimulate vegetation. The inorganic manures are easily obtained, cheap, and of light carriage. Ammoniacal and other nitrogenous manures, though not so abundant as the inorganic, are not difficult to obtain. Great quantities of ammonia are thrown away at the gas works; nitrate of soda and guano are not very costly; and woollen rags, hair, and other animal waste, may often be had. The bulky and weighty organic matters may be grown on the ground, and ploughed down, between crops, as green manure; drawing the organic elements from the air. And night soil, much stronger than cattle dung, as well in ammonia as in organic matter, will increase in proportion as the produce of the soil is eaten by men instead of beasts: as in China, where the population is dense, very few cattle are kept, and night soil is the staple manure.

There is a distinction to be borne in mind between animal and vegetable manures, that the former ferment alkaline (ammoniacal), the latter acid, and therefore require more lime than dunged land. But the lime thus employed is good for the land, and for the quality as well as quantity of the produce; with plenty of vegetable manure, to saturate its alkalinity, there is less danger of over liming. And by keeping the lime composted with earth, some months before using, it will be in a state of more intimate union with the soil, and consequently more congenial and wholesome, in its action upon the plant, then when applied fresh and alone. Land, exhausted by over cropping is not immediately restored to fertility by the addition of the materials withdrawn; but requires more or less time for them to become gradually diffused and incorporated. In composting, this is done beforehand; and manures thus applied are ready to act at once.

The vegetable salts may be supplied to the land in wood ashes; which might be largely and cheaply imported from Canada to great advantage, if free from duty; but potass, the one most in demand, may be obtained in inexhaustible quantity from our mountains of granite. The phosphates will doubtless continue to be supplied and increase by the importation of bones.

That well-manured land will do without lying down in grass, is manifested in the abundant produce of market gardens; some yielding from three to five successive crops in the year.

ROTATION OF CROPS.

The rotation of crops should present no more difficulty, in pure vegetable culture, than where cattle are kept; although here all would be grown for the market. One-half of such an estate might be in corn and pulse, *i.e.*, wheat, barley, rye, oats, peas, and beans—here is sufficient variety for soil and climate. The root crops might comprise potatoes, turnips, carrots, parsnips; the green crops, cabbage, and other market vegetables, and even tares and clover for the town stables and dairy houses. Of the green manures there is no want of variety; spurry, rape, mustard, buckwheat, lupin, to come in between crops; tansey, mugwort, comfrey, and many other herbs of heavier produce but of slower growth, to be grown perennially on the worst parts of the estate, to cut and carry to those which are under market tillage.

These green manures enrich the soil by drawing the organic elements from the air, and their inorganic, by their deep roots from the subsoil; and their amount would doubtless be greatly increased by supplying them with the cheap and portable inorganic constituents; and the condition and produce of the land proportionately improved. They should also be destructive or obnoxious to grubs and other vermin.

On this system of culture everything would go to market; there would be a quick return of money, and no outlay in cattle; consequently less capital would do, but more labour. It would differ from market gardening, in growing necessaries rather than luxuries; in the use of the plough, and the cheapest means of production, in competition with ordinary field culture, rather than forcing, out of season, for high prices; and in the self-supply of organic manure. And if not suited to large farms in the present state of public habits and opinion, and still less to the unreasoning follower of antiquity, may it not yet save from impending ruin such of the numerous class of small farmers whose skill and energy to make the most of all means within their reach are fettered by want of capital, whilst giving the public the advantage of five-fold market produce from the land thus cultivated?

J. PRIDEAUX.

HARLESTON FARMERS' CLUB.

Circumstances having occurred to prevent the regular holding of the meeting for the 15th of 3rd month (March), the subject for that evening was considered too important to stand over, namely "Cattle Epidemics and Insurance." A special meeting was appointed for the 12th inst., and the following resolution was the result of the discussion:—

"That the disease called Pleuro-pneumonia is decidedly contagious; and although at times it occurs spontaneously, it is mostly propagated by contagion. The introducer stated that the disease appears in two forms, chronic and acute, and recommended the following treatment under the chronic form:—'Peg with black hellebore in the dewlap, and give the following aperient—milk, warm, dissolved in two pints of boiling water; half a pound of Epsom salts, one ounce of nitre, two drachms of pulverized camphor, and one drachm of emetic tartar.' Then at the end of twelve hours give the following drink—'Powdered camphor, emetic tartar, antimony powder, carbonate of ammonia, of each one drachm, and one ounce of nitre well dissolved in a quart of warm gruel, every twelve hours.' He does not advise bleeding, and especially not if consolidation of the lung has taken place, or an effusion in the chest: feed with bran mashes, and drench with linseed gruel. And in the acute form bleed copiously if the animal is strong, being guided by the state of the pulse. Give one pound of Epsom salts dissolved in a quart of boiling water: and a fever dose composed of one drachm of emetic tartar, one drachm of antimony powder, and one ounce of nitre in a quart of warm gruel night and morning. Feed sparingly, keep the animal clean and dry, with a good degree of warmth, and in pure air in both cases.

"And the club strongly recommends a general insurance, not only as a protection to the owner, but as one of the most sure means of eradicating the disease, as there would then be no inducement to sell the diseased stock so as to spread it amongst healthy cattle."

At a meeting held on the 19th inst., the subject for discussion was, "Are the Burdens upon Land equally proportioned between the fixed and floating capital?"

Resolution:—"That in the opinion of this meeting the *direct* burdens on land between the fixed and floating capital are firmly and equitably levied; but in reference to those of an *in*direct character, a thorough revision of the stamp duties, with a view to their better apportionment; relieving personal property from its present unjust and disproportionate charge, and making an equitable distribution on the sale and transmission of property whether real or personal, so as to remedy all existing inequalities, appears to the members present to be of paramount importance."

FRANCIS DIX, Secretary.

YORK FARMERS' CLUB.

On Thursday, April 13, the periodical meeting of this institution was held at Mr. White's, Low Ousegate. The subject for discussion was

THE CONSTRUCTION OF STABLES AND COW-HOUSES,

and was introduced by Dr. LAYCOCK, who, on a former occasion, brought forward the same topic.

Dr. LAYCOCK, having been called to the chair, addressed the meeting in the following terms:—On a previous occasion when I had the honour and pleasure of introducing to the York Farmers' Club the question of the better construction of stables and cow-houses, the meeting resolved, after some discussion, that it should be adjourned. On that occasion I dwelt principally upon the philosophy of ventilation, and the necessity that those animals which man uses for economical purposes should have the means essential to good health. The discussion at the last meeting turned principally upon the best construction of stables, and the general results seemed to be this, that no general rule could be made applicable to every kind of horse. The agricultural horse is placed under circumstances widely different from those of the horses used in towns, whether as carriage, cart, or dray horses, and the race-horse and hunter are under circumstances differing from those of both the others. The daily exposure of the farming-horse to vicissitudes of temperature, and at the same time to a free and pure air, renders it much better able to endure a deficient supply of warmth, and much less liable to diseases arising from taking cold. It is also strengthened to resist the injurious effects of the gases that arise from the accumulated refuse of unclean stables. The principles, however, of strict cleanliness and good ventilation apply very forcibly to the treatment of even the agricultural horse, and much profit would arise to the farmer by a more regular attention to them. With regard to the race-horse and hunter, and the carriage-horses of the country gentleman, little need be said, although good grooms are sometimes led into error by a desire to have their horses' coats fine and smooth. To accomplish this end, they keep the stables at a high temperature, not by admitting pure warm air, but by shutting out the external atmosphere. Such horses are like those human beings who live in unnaturally heated apartments, and are readily attacked by inflammatory affections of the lungs, and by rheumatic disorders. It is in this class of stables that some method of warning them might be adopted, which comprises ventilation as well. There are such methods used now in the warming of houses and public buildings, and gentlemen might use one or other of them in their stabling. Some surprise was expressed on a former occasion that I should recommend an open fire-place in stables of this kind; apprehending, I presume, danger from the fire. In conversation, however, with architects, I have been assured that the construction in stables of an open fire-place, so as to avoid the least danger, would be perfectly easy; and if this be so, an open fire-place would certainly be the cheaper method. At all events *some* way of artificially warming the stable of the carriage horse and hunter, is better than shutting up every chink and crevice for the purpose, and thereby excluding what is most essential to the horse's comfort. With regard to the stables in towns, they differ very much in different localities. The stables of York are not of the best construction; we have no mews as in London and other places. And I feel quite convinced that if some of the old tumbling down cottage property in the heart of the city, injuring other property adjoining, were rebuilt on a good and comprehensive principle as mews, it would pay far better than in does at present. It is a speculation which deserves the attention of builders. There are many professional and other gentlemen who have horses they value much, and who are sufficiently awake to the value of a convenient and well ventilated stable, to encourage such a speculation immediately. The construction of cow-houses in town and country, must be on different principles. The country cow, like the country horse, is less delicate in health, if the phrase may be permitted. It can roam the pastures at pleasure, and at night it is sufficient for its health if it be sheltered from the wind and drop dry. Not so the town cow. Night and day it stands in the same spot, has no exercise, gets comparatively little green food, and its diet is such as will stimulate it to give a greater quantity of milk. Consumption is the consequence of this treatment, and if not this, the milk is rendered unwholesome, and it has been thought by some who have examined it, that it contains the cause of consumption, viz., what has been termed tubercular matter, and which, if deposited in the lungs, brings on that disease. Another circumstance of importance to remember is, the fact, that this unskilful treatment of the milch-cow renders it more liable to suffer and die, from such diseases as the pleuro-pneumonia, lately prevalent. Precisely the same principles are applicable to fevers that attack animals gene-

rally, and which are properly epizootics; as fevers which attack the human race generally, and are termed epidemics. I believe not a tithe of public attention has been directed to this subject that it deserves. Many hundreds of milch-cows have perished of this lately prevalent disease, and many hundreds, ready to die, have been killed, and their carcases sold for food. I am assured that this has been very much practised in the north. But not only are the poorer classes thus exposed to the risks of unwholesome food, but it is not improbable that some of the epidemics from which man suffers have their origin amongst domestic animals placed in circumstances by which their blood is corrupted. That there may be an exchange of fevers between man and animals cannot be doubted; I have had patients who had every symptom of the murrain, after attending cattle suffering from it. The cow will take the small-pox, for the cow-pox is nothing else than the small-pox in the cow. There is reason too to suspect that the late influenza has had some connection with the pleuro-pneumonia, prevalent amongst cattle. We cannot say that it has been contracted from the cattle, but it is quite possible, and even probable. Thus, by a better system of construction of stables and cow-houses we may do incalculable good to society as well as ourselves. I have now to apologise to the members of the Farmer's Club, for the very general nature of the observations I have made. But I apprehend the English farmer has sufficient energy and enterprise to carry any general principles into effect, if once convinced of their propriety and utility. It is for this reason that I have confined myself to generalities, and avoided details.

The SECRETARY then read the following letter from G. J. Lloyd, Esq., of East Field House, Dunnington, near this city, as bearing upon the subject before the meeting:

"Sir,—A few days since I had the pleasure of going through the stables of Mr. Dickinson, the job-master in Curzon-street. I was much struck by the care with which everything was arranged in the way most likely to be conducive to the comfort and health of the horses; and thinking that a few memoranda might not be unacceptable at your adjourned discussion on the ventilation and warming of stables and cow-houses, I now trouble you with this note, of which you can make whatever use you think best.

"The stables were built by Mr. Dickinson. They are not on the ground, but on what in a house would be called the first-floor. Below are coach-houses, harness-rooms, a chamber where the air used in ventilating the stables is warmed when necessary, and other buildings. Above are the stables. They open upon a broad covered gallery that overlooks the yard, and terminate in a gravelled incline leading down into it.

"On entering the stables you are met by no unpleasant smell; almost the only perceptible difference between the atmosphere within and without is that the former is rather warmer at this time of the year. It is to the arrangements which insure this cleanliness and warmth that I wish to draw your attention.

"The stables are paved as nearly on the level as may be—allowing just sufficient fall to carry off the urine from the top to the foot of the stalls, which as usual is the lowest part of the floor, and from whence it slightly rises again to the wall. The urine is not allowed to trickle slowly down the pavement as it commonly does, to an open channel at the horse's heels, but from the top to the bottom of each stall run one, two, or more narrow grooves or gutters (I think of iron,) their upper edges being flush with the pavement. These quickly receive the urine and carry it to a larger channel running across the foot of all the stalls, and this again conveys it to a tank where these drainings are collected from all the stables to be used as required for agricultural purposes. Some of the grooves are covered with a flat piece of iron the breadth and thickness of common hooping—which lies lightly over them—kept in its place merely by some slight catch—allowing the urine readily to enter the groove, and merely excluding the small pieces of straw which are apt to get in and choke it. The grooves are in the form of the letter V, angular at the bottom. I looked under the straw in two or three of the stalls and scarcely perceived any moisture. This rapid withdrawal of urine from the surface prevents evaporation, and mainly conduces to the sweetness of the stables; but what still more promotes this essential object is a constant circulation of fresh air throughout, provided for by a well-arranged plan of ventilation.

"Below the stables is a chamber, in which air passing over hot-water pipes is raised to any required temperature. From this chamber it is carried along the whole range of stables through a flue that runs nearly on a level with the floor and communicates with each at the end opposite the door. From this flue also others diverge at right angles, and carry the warm air along the wall at the head of the stalls. In each manger is a grated opening, which admits fresh air from the last flue almost at the horse's nostrils. To make room for this ample provision of pure air, and if necessary warm air, an easy escape is supplied to that which has been already used—which has passed through the lungs. Over each stable door is a lattice, like a Venetian blind, opening into a large flue carried along the top and the whole length of the gallery into which all the stables open; this flue again is connected with the chimney of the fire by which the pipes are heated. The hot air in the chimney passing upwards causes a constant draught, removing the foul air from the flue, and so directly from the stables, where the vacancy is immediately supplied by pure air from the flues first mentioned.

"By these means, Mr. Dickinson told me, he had no difficulty in keeping a pure atmosphere, and an equable, wholesome temperature throughout his stables at every season of the year. The air supplied to them may of course be warmed or not at pleasure.

"In every other part of the stable economy similar attention is shown to health, comfort, and cleanliness—but without that affectation of over neatness—that excessive nicety which is often made a parade of—but which answers no really useful purpose, and adds materially to the stable expenses. Mr. Dickinson has evidently

endeavoured to supply everything he thought really useful in the best and most complete manner, whatever might be the cost of it—but, at the same time, to carry out his plans as economically as it was possible, without impairing their efficiency. He is of opinion, and I doubt not justly so, that the money thus spent has been well spent—that in the greater health of his horses—in the saving of labour, and in other ways, he is eventually a gainer in the pocket. Among those other ways I must not forget to mention the application of the urine draining from the stables. It is used as manure to grass land, mixed with water in different proportions according to the nature of the herbage. Whenever grass is mown, the manure cart immediately goes over the land administering fresh nourishment to the plants—the good effects are very perceptible, for by these means Mr. Dickinson said he had last year been able to mow one piece of ground over no less than ten times—and that he seldom did so less than seven.

"Without any reference to the health of the horses, this single fact (and I believe I state it exactly as it was told to me) would prove that a considerable sum may be profitably employed in carefully draining stables, and collecting those drainings which are now so generally wasted, but which, if properly husbanded and applied, are capable of adding so much to the produce of a farm.

"So perfect a system of ventilation, as I have attempted to describe, cannot, perhaps, be applied either easily or economically to any but a large and new establishment—yet parts of it may not unfrequently be admissible—and, at all events, its great object, namely, the constant circulation of fresh air through the stable at a moderate and equable temperature, cannot be too constantly before the mind of every one anxious to have his horses healthy and in good working condition.

"I may just notice another contrivance, which, though perhaps not very material, has proved both beneficial and economical both here and in other places where I have seen it tried, and it is readily applicable anywhere. There are no hay-racks, but each manger is divided, and one part sunk lower than the other, and with a grated bottom, is used instead. Food is thus presented more naturally to the horses—their eyes and noses are not incommoded with dust and hay-seeds—and the hay is less wasted.

* * * * * *

"I remain, Sir, yours truly,

"George John Lloyd.

"189, Regent-Street, March 1st, 1848.

"To Mr. White, Hon. Sec. York Farmers' Club."

Dr. Laycock observed that this letter was an excellent illustration of his remarks, and showed that where a general principle was laid down, there were parties ready to adopt it, and to adopt it too successfully, as in Mr. Dickinson's case.

Thanks were voted to Dr. Laycock and to Mr. Lloyd, for their respective papers, and the ordinary business of the meeting was then transacted. Five new members were admitted, some additions were directed to be made to the library, and one or two subjects announced for discussion at future meetings. Among other matters, the Secretary produced copies of the printed prize schedules for the Royal Agricultural Society's meeting, at York, in July next, which had been forwarded to him in his official capacity, as connected with the York Farmers' Club, by Mr. J. L. Foster, one of the local secretaries appointed for the preliminary purposes of that great meeting. It was suggested that they should be hung up in the Club Lecture Room, and thanks were voted to Mr. Foster for having furnished them.

OPERATIONS UPON ANIMALS UNDER THE INFLUENCE OF CHLOROFORM.

The Secretary said, before the meeting was adjourned, he was anxious to direct the attention of agriculturists to two most satisfactory operations which had been performed by Mr. Cooper, of this city, veterinary surgeon, upon two animals, through the administration of chloroform. The first operation, which was that of castration, was performed by Mr. Cooper, on a five years old horse, belonging to Mr. Smallwood, of Middlethorpe, on Monday week. He (Mr. White) applied the chloroform, and in three minutes the animal was thrown into a perfect state of sleep; in other six minutes the operation was effected; and in three minutes more (making altogether twelve minutes) the horse was again awake; there was muscular motion during part of the operation, but it was very momentary and very mild. On Wednesday, in the present week, a similar operation was performed upon a yearling colt of Mr. Smallwood's, which was effected in eleven minutes and a half, and in this case there was not the slightest indication of pain. Mr. Cooper is of opinion that the application will be found very useful in operations of this sort, and also in that of "firing" horses.

Dr. Laycock offered a few remarks upon the subject, and referred to a successful operation having been performed, through the agency of chloroform, upon a favourite little spaniel belonging to a lady in this city.

The meeting then adjourned to the first fortnight fair-day in May.—Yorkshireman.

"DEODORISED MANURES."

Sir,—I trust you will permit me, through the medium of your widely-circulating columns, to correct an erroneous impression upon a subject of vast importance to the interests of agriculture.

Your recent notices of my "Patent Deodorising Fluid," and my letter to Lord Morpeth on "Sanatory Reform and Agricultural Improvement," have caused several of your agricultural readers to address me; and one or two of them inform me that endeavours are made to persuade them that deodorised night-soil, and other deodorised manures, must prove injurious to vegetation, in consequence of the iron contained in the deodorising fluid.

I find that the parties making these endeavours are persons interested in causing preference to be given to manures offered by themselves; but, without pausing to institute comparisons between offensive and inordo-

rous manures—between manures, on the one hand, which are pernicious to animal health and wasteful of the elements of vegetation, and manures, on the other hand, from which the sources of injury to human life are removed, whilst the volatile essences of fertility are preserved. I will proceed to refute the misrepresentation by which the latter are sought to be disparaged.

I believe it is generally known that the fluid I use for the purpose of destroying the sulphuretted hydrogen, and other deleterious gases, and preventing the escape of ammonia and other volatile elements of fertility found in nightsoil, &c., consists of a salt of iron ; but it is not equally well known, except among chemists and scientific men, that iron forms an exception to all other metallic salts—that it is, indeed, the only metallic salt friendly to man. Such, however, is the indisputable fact. Iron is found in wheat, and in trees and plants generally ; and iron flows in our veins ; it is found, too, in the most approved animal manures—in the dung of sheep, goats, and cattle. Iron, therefore, being found in the food of plants, in the plants themselves, and in the blood of those by whom such plants are eaten, it is obviously opposed to all evidence to contend that iron is injurious to vegetation. But even if the fact had been otherwise—if iron were pernicious to vegetation, none but ignorant or interested parties would contend that any injury could arise from manures deodorised by it, inasmuch as the iron contained in the deodorising fluid becomes decomposed by the sulphuretted hydrogen it overcomes, and the most minute chemical tests fail to discover any trace of it in the matter upon which it has discharged its office.

I have the honour to be, sir,

Your most obedient servant,

CHARLES F. ELLERMAN.

80 *and* 81, *St. Martin's Lane, April*, 1848.

—Mark Lane Express.

ON THE VARIOUS SOURCES OF PHOSPHORIC ACID FOR AGRICULTURAL PURPOSES; AND ON ITS PRESENCE IN DIFFERENT GEOLOGICAL STRATA.

BY J. C. NESBIT, ESQ., F.G.S., M.C.S.L., OF THE CHEMICAL AND AGRICULTURAL SCHOOL, KENNINGTON, NEAR LONDON.

The progress of agricultural improvement in future years may be expected to be permanent and rapid in proportion to the assistance it shall derive from its union with science and philosophy. On every side we even now find that farmers give more heed and attention to the suggestions of science than the most sanguine could five years since have hoped for; and, with the progress of a more liberal, and extended chemical and geological knowledge in the rising generation of agriculturists, will empiricism cease, and "Practice with Science" be triumphantly throned in its stead.

The object of the present essay is to bring prominently before the agricultural world the sources of a supply of one of the most important of the proximate elements found in plants—namely, PHOSPHORIC ACID. In the course of the investigation it became necessary to analyze a great number of rocks, soils, and fossils, from different geological strata; and for the greater part of these analyses I am indebted to the zeal, assiduity, and care of those of my pupils whose names will be found attached to many of the subsequent tables, and to whom I beg publicly to tender my thanks.

After the publication some time since of my discovery of the presence of phosphoric acid in large quantities in the marls of Farnham, I continued my investigations, not only in those strata, but also in various other parts of the kingdom; and the result has been that numerous localities have been discovered where fossils, containing a very great per-centage of phosphoric acid, exist in large quantity, and easily and cheaply available for the purposes of the improvement of agriculture.

Before proceeding to the enumeration and description of these various deposits, it may not be amiss to offer a few observations on the composition of bone, and on the relative effects of its different components in fertilizing and improving land. Bones of animals, when separated from adhering flesh and fat, consist essentially of two distinct forms of matter; the one a gelatinous or albuminous animal substance, the other an earthy matter. This structure of bones may very easily be shown by acting upon them by chemical means. If a bone be immersed for a few days in dilute muriatic acid, the whole of the earthy matter will be dissolved, and the gelatinous matter retaining the exact shape of the bone will be left behind. If a bone of considerable length, as one of the bones of the human arm, be treated in this manner, the removal of the earthy matter makes it so flexible that it can easily be tied in a knot. The muriatic solution will contain the earthy matter. On the other hand, if a bone be exposed gradually in the fire to a good red heat, the gelatinous animal matter will be dissipated; and the earthy matter in this case, also retaining the shape of the bone, will be left behind.

Since the application of bones to the land has in this country been productive of such general beneficial effect, it has been the subject of controversy whether the increased fertility of the land is produced by the animal or earthy matter of the bone. It cannot be denied that animal matter itself is a powerful manure; and yet experiments seem to prove that the essential fertilizing principles of bones reside in their earthy ingredients. Though we must not confound rapidity of effect with fertilizing power, yet the increased efficiency of bones which have been boiled to separate the fat and animal matter—the beneficial effects found by the farmers of Hampshire and other places, from allowing

the bones to decompose with wood or peat-ashes—and, above all, the experiments of Mr. Pusey,* who allowed bones mixed with sand to heat, and found them superior to bones alone, all tend to show that, though the animal matter be in a measure destroyed, that the fertilizing effects, for turnips at least, are rather increased than diminished.

Experiments have also been made, both with burnt bones, and also with burnt bones rendered soluble either by muriatic or sulphuric acid; and though completely destitute of animal matter, their effect on the turnip crop has always exceeded undecomposed bones, most likely in consequence of the animal matter of fresh bones preventing the rapid solution of the earthy matter.

By reference to the analysis of bones in the following table it will be seen that by far the greater portion of the earthy matter consists of phosphate of lime and magnesia—that is, of compounds of phosphoric acid with lime and with magnesia.

COMPOSITION OF BONE.

	1. Bone of Sheep.	2. Bone of Ox.	3. Bone of Haddock.	4. Thigh-bone of Sheep.
Organic or animal matter.....	43.3	48.5	39.5	30.3
Inorganic matter—				
Phosphate of lime.....	50.6	45.2	56.1	48.0
Carbonate of lime.....	4.5	6.1	3.6	21.7
Magnesia ..	0.9	0.2	0 8	
Soda	0.3	0.2	0.8	
Potash.....	0.2	0.1	—	

The three first analyses are by Dr. Thomson; the fourth by my pupil, Mr. Bailey. The phosphate of lime includes an appreciable though small amount of fluoride of calcium, which is always found in bones, either recent or fossil.

As it is well known that most soils contain a certain quantity of both lime and magnesia, it is not to be supposed that the earthy matter of bones is efficient as a manure in consequence of their presence, but rather in consequence of the presence of the phosphoric acid with which they are united. Experiments have proved that compounds of phosphoric acid, of whatever kind, if rendered soluble enough, are productive of the greatest advantage to plants (particularly to root crops), and consequently that in our further investigation we shall not be far from the truth if we value our different samples of bones in direct proportion to their phosphoric acid or its equivalent of phosphate of lime (bone earth). In order to compare the values in respect to phosphoric acid of the different substances discovered in various strata, the average of a number of analyses of bone may be taken as a convenient standard. This average is the more necessary, because not only do bones of different animals vary in their proportion of phosphate of lime, but even the different bones of the same animal, or similar bones of like species at unlike ages, contain diverse quantities of this substance. By the following table it will be seen that the average of phosphate of lime, from six samples of dry bone, is about 50 per cent.

PHOSPHATE OF LIME IN BONES.

	Phos. of Lime.	
Bone of sheep.....	50·00	Dr. Thomson.
Bone of ox	45·20	
Bone of ox	59·00	Berzelius.
Human bone	54·54	
Bone	37·70	Fourcroy.
Thigh bone of sheep	48·00	Bailey.
	6)295·04	
Average	49·17	

Now we shall probably not be far from the mark if we reckon that bones, as ordinarily found in commerce, contain at least 10 per cent. of extraneous matter, even supposing them not to have received the usual addition of ground oyster-shells or soap-boiler's waste. We shall not deduct for the amount of moisture contained, as all our subsequent experiments were made upon the dried substance, and the comparison will therefore be correct. Deducting, however, 10 per cent. for impurities, we shall have 45 *per cent.* as the average amount of phosphate of lime in bones, and this number we shall use in all our subsequent comparisons of the phosphoric value of different substances.

In recent times the supply of phosphate of lime has not been derived solely from the use of bones, but has been supplied in great quantities from other sources, particularly in the form of guano. The better varieties of Peruvian and Ichaboe guano* do not depend alone on phosphate of lime for their fertilizing effect, but also in a great measure on the amount of soluble ammoniacal salts which they likewise contain. Peruvian guano contains from 14 to 24 per cent. of phosphate of lime and from 8 to 20 per cent. of ammonia; the Ichaboe contains from 20 to 40 per cent. of phosphate of lime with from 5 to 10 of ammonia. The inferior kinds of guano, however, such as the Saldanha Bay and Patagonian, owe their value almost wholly to their phosphate of lime; some varieties indeed of the latter have a strong ammoniacal odour, but in general they do not contain more than from 2 to 4 per cent. of ammonia—the Saldanha guano has rarely more than 1 per cent. of ammonia. Some samples of Saldanha Bay I have found to contain 60 per cent. of sand, and a very small amount of phosphates, but other samples contained from 50 to 60 per cent. of phosphate of lime and only a small quantity of siliceous matter. The annexed table shows the amount of phosphate of lime in three samples, as determined in our laboratory, together with the weight equivalent in phopshoric value to 100 tons of bones.

PHOSPHATE OF LIME IN SALDANHA BAY GUANO.

	Phosphate of lime.	Amount equivalent in phosphate of lime to 100 tons of bones.
	per cent.	tons.
1	64·2	70
2	59·1	76
3	56·1	80

* Journal of Royal Agr. Soc. Eng., vol. viii., p. 417.

* This guano is now quite out of the market, though spurious varieties are still sold under its name.

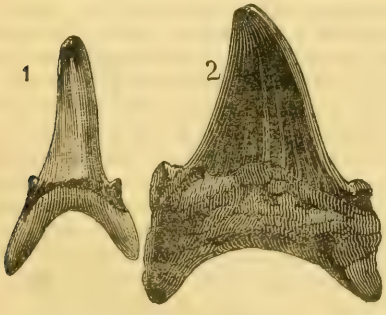
In describing the localities where natural sources of phosphate of lime exist in this country, it will be convenient to follow the order of the geological strata, commencing at that which is the uppermost of the series, viz.—

THE TERTIARY SYSTEM OF DEPOSITS.

The name of tertiary is given to all those vast beds of clay, sand, shell marls, and gravel, which in this country are found resting upon the chalk. The general range of chalk hills running from Dorsetshire to the Yorkshire wolds dips pretty uniformly to the east, running under the tertiary beds which rest upon it. The whole of the strata eastward of these chalk hills may be reckoned as tertiary, with the exception of the interior districts of Kent, Surrey, and Sussex, and the marshes to the seaward of the wolds. The tertiary is further subdivided by geologists into the *London clays* (which form the lowermost strata, and rest on the chalk), the Bagshot sand, and the crag. The tertiary strata are distinguished from all other geological strata from their containing immense numbers of the fossil bones of mammalian animals,* whilst none of these have yet been found below the chalk except the bones of animals of the reptile class.

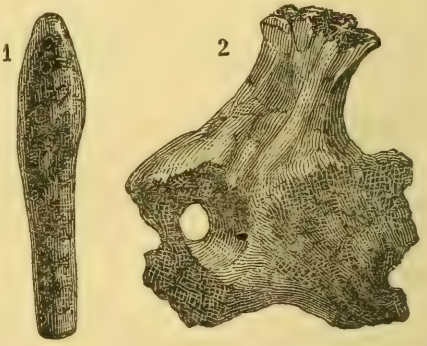
Though mammalian bones are found all over the tertiary, yet in the crag of Norfolk, Suffolk, and Essex do they most particularly abound. The crag of these counties consists of various beds of sand, gravel, and shells, varying from a few feet to 40 or 50 feet in thickness, and resting upon the blue clay which lies upon the chalk. It is found on the south, first at Walton-on-the-Naze in Essex, and extending northwards by Harwich, is largely developed at Felixstow, Ipswich, Woodbridge, Orford, Aldborough, Southwold, Norwich, Cromer, and other places, forming oftentimes the cliffs on the coast, and extending from the shore into the interior, to a yet unknown extent. The crag in many places abounds in the teeth of sharks, (represented in Fig. 1) the bones of

TEETH OF SHARKS.



the elephant, the hippopotamus, the rhinoceros, and the whale: some in an excellent state of preservation, others in water-worn fragments of all varieties of size. With the fragments of bones are also found great numbers of modular masses of various shapes, and from an ounce to two pounds in weight. These modules were at first considered to be merely indurated masses of clay rounded by the washing of water. To Professor Henslow is due the honour of first pointing out the true nature of these substances, and proving them to be of animal origin. Though the question is still open to debate, yet the general opinion of scientific men is that these substances are the fossil dung of extinct races of animals, and the name *Coprolith* (meaning literally *stone-dung*) has in consequence been given them. Without giving any opinion upon the theory of their formation, I shall continue to use the name applied to them. The crag coproliths present on fracture a dark brown or red colour, which easily distinguishes them from flint stones or gravel. They have a specific gravity of 2·8, that is they are 2·8 times heavier than water; they are readily acted upon by acid, and in dissolving give out a peculiar animal odour. The accompanying wood-cut represents a coprolith and a fragment of fossil bone.

Coprolith. Fossil Bone.



The coproliths as well as the bones are principally composed of phosphate of lime, carbonate of lime, and small quantities of magnesia, iron, alumina, fluorine, and from 10 to 20 per cent. of silica. The following table will show the amount of phosphoric acid, &c., in three samples of bone and two of coproliths from the crag district.

ANALYSIS OF FOSSIL BONES AND COPROLITHS.

	Phosphoric acid.	Equivalent in Phos.lime	Amount equal to 100 tons bones.	Analysts.
	Per cent.	Per cent.	Tons.	
1 Fossil bone from Cromer, Norfolk	22.17	45.50	99	Trumper.
2 Fossil bone of whale from Cromer, Norfolk ..	19.19	39.39	114	Gater.
3 Fossil bone from among the coproliths from Felixstow	21.16	43.42	103	G. Solomon.
4 Coprolith from the Crag, Suffolk ..	22.30	45.76	98	Blyth.
5 Coprolith from Suffolk.....	26.10	53.50	84	J.C. Nesbit.

The coproliths and fragments of bone are found pretty plentifully along the shore at numerous places along

* Mammalian animals are those that suckle their young, as the horse, cow, sheep, whale, &c.

the coasts of Essex, Suffolk, and Norfolk, and in the interior, are in many places readily obtained within a few feet from the surface, by merely sifting them from the crag which is dug up for agricultural purposes. They have for some time been extensively used for the making of super-phosphate of lime and other manures, some parties digging up 60 or 70 tons per week. It is quite certain that they will be found, if sought for, over the greater part of the crag district, even in places where they are at present perfectly unknown. The shelly crag itself, which is extensively used for manure, contains, besides calcarous matter, a certain portion also of phosphate of lime, to which, doubtless, it owes part of its fertilizing properties.

The following table shows the result of seven analyses of crag from different places :—

PHOSPHORIC ACID IN CRAG.

	Per cent. of Phosphoric Acid.	Per cent. of Phosphate of Lime.	Analysts.
1	.53	1.10	Trumper
2	.38	0.78	E. Agate
3	.36	0.74	Do.
4	.45	0.93	Halsted
5	.44	0.91	Do.
6	.25	0.52	G. Solomon
7	.23	0.47	Hutley

A number of shell marls and other substances from tertiary districts have also been examined, and in most of them phosphate of lime has been found in quantities sufficient to make the marls useful on the land. In the Isle of Wight, between Colwell Bay and Alum Bay, are many shell marls, which do not at all seem to be noticed by the neighbouring farmers. The following are some of the results ;—

ANALYSES OF VARIOUS MARLS, &c., FROM TERTIARY DISTRICTS.

	Phos. acid.	Phos. lime.	Analysts.
38. Oyster bed, Colwell Bay, Isle of Wight	0.44	0.91	Trumper
52. Fresh water limestone, Alum Bay, Isle of Wight	1.07	2.21	Donovan
57. Coast of shells, Bognor ...	0.10	0.21	Gater
60. Fresh water shell marl, Alum Bay, Isle of Wight	0.23	0.48	E. Cottingham
63. Shark's Tooth, Isle of Sheppy.....	9.50	19.50	Solomon

Nodular bodies of a similar kind to those in the crag, and containing as much as 59 per cent. of phosphate of lime, have been found by Mr. John Brown in the London clay, in the neighbourhood of Hampstead. It is very probable that they may be found in many other tertiary deposits besides the crag, upon a proper examination. The value of these substances, which occur so abundantly in the eastern counties, to the agriculture and wealth of these districts, will be great; and the attention of owners of property ought every where to be directed to the discovery of these fossil riches of the earth.

In a continuation of this paper it will be shewn that such bodies are not confined to the tertiary districts, but that similar substances, or at least substances containing phosphate of lime, are abundant in several other geological formations.

The necessity of a careful examination and analysis of soils, subsoils, rock, and marls, cannot too often be impressed upon enterprising landlords and improving tenants.

CULTIVATION OF POTATOES FROM CUTTINGS.

EXTRACT OF A LETTER SENT BY MR. PEARCE TO A FRIEND.

In the spring of 1846, when the alarm of disease in potatoes was very rife, I referred to some old agricultural tracts, with the hope of gathering a few hints that might tend to alleviate the forthcoming distress of scarcity in this most valuable root. Finding in one of them a remark that led to the idea that a crop of potatoes might be produced from cuttings, I was struck with the singularity of the suggestion, and I determined to make an experiment agreeably thereto; and though it was then the middle of May, I considered that even the cuttings from the rows then growing might, if soon dibbled in, be successful. I therefore had ground dug up sufficient to plant fifty yards running in rows alongside of the then-growing rows, which were now from 12 to 14 or 15 inches high, and tolerably bushy and strong. From these growing rows I caused to be cut off, about the 10th of June, the strongest of their leaders or branches, so as to be about 8 or 10 inches in length; and they were immediately dibbled in singly, as cabbage-plants are, the dibble pressing some of the earth lightly against the plants, which were then well watered. They drooped for two or three days, as cabbage-plants do; but being well watered morn and eve, they began to look up the fourth or fifth day, and then showed, on examination, that they had begun to strike out very fine fibrous roots, and appeared very promising. Then followed earthing up; and in August they began to be vigorous rows of most healthy plants. The roots were found to be forming small tubers, and those new rows were nearly as high as the old ones. The result, to my great satisfaction, was that in the middle of October, 1846, both the old and new rows were dug up; and, save that the old ones had more large tainted potatoes than the new ones, there was little or no difference in size; and in respect to weight, the old rows produced very little more than the new ones.

I trust I shall not be thought sanguine in recommending this improvement, when I remark that, first, the poor man by adopting this plan will save one-half his stock of potatoes now usually planted by him in March; secondly, that the community will have distributed one-half of the potatoes usually planted in March throughout the kingdom, which may be applied for food; and thirdly, that the poor industrious cottager has the opportunity of growing crops of winter and early vegetables for full two spring months on half the land he has hitherto taken for his potato-crop in March.

VENTILATION OF CATTLE HOUSES, &c.

The proper ventilation of stables and buildings in which cattle are lodged is a subject which cannot be too strongly represented to the mind of the farmer and cattle breeder; there is no point connected with the successful feeding and management of stock that bears so important a relation to their health and consequent condition as the purity of the atmosphere which they inhale. The influence of noxious effluvia is even stronger upon the constitution of the lower animals than upon that of man; air, vitiated by the presence of the poisonous gas termed sulphuretted-hydrogen to a sufficient degree to be fatal to a dog or horse, will not produce death in a man, and cattle are extremely susceptible to malarious influences in general.

The atmosphere of stables and cattle houses is usually charged not only with the common products of respiration, but also with the emanations from excrementitious matter (where great attention is not paid to the state of their buildings, often in very large quantity), which, if it be not regularly cleared away, soon begins to undergo decomposition, and becomes the source of floods of gaseous matter rife with the seeds of disease. Ammonia is also largely evolved from the liquid excrements, and although not acting as a malaria, this matter when constantly inhaled (as is mostly the case in stables) is productive of a condition in the animal which very much disposes it to attacks of inflammation of the organs of breathing; thus we find that horses are always predisposed to inflammation of the lungs, and it is worthy of notice that persons much employed in stables contract a similar tendency. Independently of the presence of any extraneous matter, air is rendered totally unfit for the support of animal life by the process of respiration itself. The air exhaled from the lungs of an animal consists in a great measure of the gas termed carbonic acid, a substance which breathed in a pure or undiluted state causes immediate death by suffocation. A man expires upwards of 650 feet of gas daily, which if collected in a close chamber or vessel is capable of destroying the life of other animals; and of course the atmosphere of a common building containing a number of animals, unless it were renewed frequently, would soon become unfitted to support the vital process; and the chemical changes in the blood essential to the performance of the functions of the various organs not being produced, the circulation is interrupted, the power of assimilating food weakened, and the whole economy of the animal system impeded. Even when the badness of the air is not sufficient to produce immediate and urgent symptoms, its deleterious effects are not the less certainly produced upon the constitutional powers of the animal, which soon gets out of condition; the food fails to be converted by the act of digestion into nutrient matter, the animal becomes predisposed to disease, and probably falls a victim to the first attacks of any prevailing epidemic.

There can be no doubt that dry and pure air is the most powerful preventive of disease, and that if the state of cattle houses, as to dryness and ventilation, were more carefully attended to, the farmer would generally have less loss to deplore at the end of an unhealthy season. Such arrangements should be made in the building as to ensure a constant renewal of its atmosphere without establishing draughts; this may easily be effected by providing outlets near the ceilings for the heated and vitiated expired air, the supply of fresh being kept up by communication with the external atmosphere near the ground. By these means a continued circulation is kept up, the fresh air entering below to occupy the place of that which has been respired, and which escapes by the top; the opening should not be large in either case, and might be covered advantageously by perforated metal, in which the holes are sufficiently large and numerous to admit of the passage of sufficient air. By thus breaking up the volume of air admitted into minute currents, the danger of draughts, and consequent colds, is entirely done away with.

In the ventilation of stables it is also particularly desirable to deprive the atmosphere of the ammonia which is made manifest by the irritation it produces both on nose and eyes whenever one enters such a locality. Ammonia may be absorbed from the atmosphere by exposing in large flat trays powdered charcoal or sawdust, moistened by sulphuric acid. The ammonia from its chemical nature combines with avidity with the acid, and in the place of a deleterious nuisance a matter is produced possessing the most powerful fertilizing properties. The tendency of ammonia to combine with an acid may be proved by holding the stopper of a vinegar bottle near the mouth of another containing hartshorn, when copious white fumes will be formed, indicating the chemical combination of the ammonia and acid.—Agriculturist.

BURTON-ON-TRENT FARMERS' CLUB.

The meeting appointed for discussion of a subject to be introduced by Messrs. G. Greaves and Robinson, of Tamworth, was held on April 13th, and was attended by a considerable body of the members. After the usual business had been gone through, Mr. Greaves was called on by the President, and read the following paper :—

"ON THE INFLUENCE OF THE SALINE INGREDIENTS OF FOOD ON THE HEALTH OF ANIMALS.

"I have ventured to accept the task of preparing for the club a few remarks on this subject, though I am quite aware that in the present state of our knowledge there is much that is very obscure in it, and that I am but imperfectly fitted to bring together what light has of late been shed on it. I believe, however, that I shall be able to demonstrate to you that the subject is very worthy of the regard of practical farmers, and that even now many useful cautions may be suggested by its discussion.

"It has only within a late period been proved that the few alkaline and earthy salts which are mingled with almost every soil are necessary to the existence of the various forms of vegetable life. They were accounted merely the accidental inhabitants of plants, till in the progress of the science of chemistry it was demonstrated that they were invariably present; that the proportion of the various substances was constant in each kind of plant; moreover that the quantity was different in different stages of the growth of plants, and that each part of a plant chose for itself the peculiar substances which were needed for its healthy development. We are all now very well aware that if these substances be deficient in the soil, plants will not flourish; and the main attention of the farmer is now directed to the restoration, in each year, of what the crops of each year carry away of these substances. There are certainly other conditions of the soil needed for the profitable growth of agricultural crops: besides the presence of these salts and earths, there must be something to yield ammonia and carbonic acid; still the broad fact is clear, that without these materials plants will not grow. It is also known that if certain saline ingredients be present in the soil, they are noxious to plants; and the presence of those, which are in small quantities beneficial is also noxious, if the land be too full of them. Salts of iron are pernicious in small quantities; and nitrates of soda and potass and common salt, so good as manures, are hurtful if excessive quantities of them be present in the soil. Nature is so full of similar adaptations of means to ends, that one used to observe her ways, and knowing how the hand that guides her does not admit either the superfluous or the deficient in the instruments of His designs, might have predicted that these same substances were necessary also to the living functions of animals, since the vegetables which gather them from the earth were intended as food for the higher order of His creation. Further, he might have predicted that, as one race of animals was destined to be nourished by the flesh of another, there would be found, as a component part of the bodies of animals, portions of these same substances. He might perhaps even have conjectured that those animals which fed upon green herbs and other vegetables would require all the substances which plants contain for the healthy discharge of their bodily functions; while carnivorous animals would have their organs so modified as not to require all, or only to need smaller quantities, of these substances. The researches of chemists have shown that the real facts elicited by experiment are precisely what I have conceived a natural philosopher might have predicted from the fact of vegetables containing definite kinds and quantities of mineral constituents. Just as the soil requires a supply of minerals to support the life of plants, so do animals require them in definite quantities; and just as the soil is rendered infertile by an excess of salines, so is the health of animals injured by greater quantities than their bodies require, or by such as take no part in their healthy functions. Herbivorous animals require a greater supply of some mineral constituents of their food; but the quantities retained in their various organs are precisely similar to those found in the bodies of carnivorous animals, and are of course all that are essential to the due functions of the latter. To begin with the stomach. In the gastric juice is found a small quantity of free muriatic acid, which can only be supplied by the chloride of sodium (common salt) or of potassium, which vegetables contain. The bile is a compound of certain products of the change of the organic materials of food with soda. Soda, therefore, is necessary in the food of all animals, and it is supplied in almost all vegetables. It is soda which is especially required in larger quantities by herbivorous animals, because in them the bile is derived in great part from their food before it has formed part of the structure of the body. An ox secretes thirty or

forty pounds of fluid bile daily, which contains three to four pounds of solid matter. This is a compound of soda, and the soda must be supplied in the daily food.

"The muscular flesh of animals contains 4 per cent. of its dry substance of saline ingredients. About one-fifth part of these are phosphates of lime and magnesia, and the remainder are phosphates and chlorides of potash and soda.

"The blood contains also about the same proportion of salines, the chief part of which consists of phosphate of soda. The red colour of the blood is caused by a small quantity of the oxide of iron, and which has long been known to fulfil very important duties in the animal economy.

"The earthy part of the bones is almost wholly formed of the phosphate of lime. Other parts of the animal structure contain other substances, but in so small quantities as to be insignificant in the view which we are taking of the subject; these minuter portions of sulphur, phosphorus, &c., which mingle with the substance of the textures, being derived from the great reservoir—the blood; of course being only deficient when the blood and flesh have long failed to receive supplies from the food.

"Though it is not exactly known what are the agencies of the saline ingredients of the flesh and blood in carrying on the living functions of the bodies of animals, yet as the same salines are always present in the same or nearly the same quantities, and as each particular portion of the fluids or solids of the body separates from the common store its own peculiar kind, it scarcely needs that we should be acquainted with the operation of each before pronouncing that each and all are in some way necessary to the health of animals.

"As regards the small quantity of iron in the blood, physiologists are pretty well agreed that it plays a most important part in the respiratory process; and the most accepted opinion is, that it is the chief agent in conveying the oxygen of the air, admitted into the lungs in that process, to the various parts of the body, where its presence is necessary to the chemical changes which are constantly going on.

"The vital principle is doubtless a something distinct from that power in nature, whatever it be, which causes, directs, and controls chemical changes out of a living body. But in dealing with matter for its own peculiar designs, it is obliged to make use of the general agents of nature as its instruments and ministers. The directing power which builds and repairs the body, which keeps its various parts in one consent, and which is in immediate relation with the conscious and intelligent inhabitant of the body, is as distinct from the chemical agent as the maker of the steam-engine, the master of its labours, is from the natural powers of chemistry and dyramics that subserve his design. But in the body or the engine the laws of chemistry are not set aside, only guided to different issues. Now, as far as sense and experiment can trace the living functions, it appears that all is done by means of the agents and materials of chemistry. It cannot, therefore, but be that the saline ingredients of the blood and flesh, which are so capable of modifying chemical changes in the organism, are essential parts of the body as much as the structure itself. The late researches of Liebig have demonstrated that in the muscular flesh the salts of potash predominate, while in the blood that circulates among the muscles, as in every other part, the salts have almost entirely soda for their base. He found the proportion of potash to the soda in the flesh of the ox as 28 to 10. In the blood, on the other hand, the soda exceeded the potash as 17 to 1. If the flesh could be wholly separated from the blood contained in its vessels, he is of opinion that the salts of soda would not be found in it at all. Such are the singular facts the analysis of the flesh and blood vessels presented to Liebig. He has shown farther, that in the blood the soda is united with phosphoric acid in that form which makes the solution of the salt capable of taking up with avidity carbonic acid, and of giving it back again as easily, under the conditions to which it is subjected in the lungs, and in its progress through the body. Thus it would seem that this salt is the chief agent in removing the carbonic acid from the blood, an office the most important in the animal economy. From the moment the food enters the stomach commencies a series of transformations in its organic constituents. It is dissolved by the agency of a fluid poured into the stomach, and which contains muriatic acid; but first it had been mingled with the secretions of the salivary glands, a saline solution capable of involving in the process of mastication large quantities of air. It is converted into chyle by mixture with the biliary and pancreatic secretions. It becomes a part of the blood, and is thence diverted to the use of the liver, or perhaps partly expended in sustaining the changes which produce animal heat, or is transformed into the living structure. It is unbuilt again, and its materials decomposed into other proximate principles, which pass out of the body through the lungs, the skin, the kidneys, or the bowels. All these changes are accompanied by corresponding changes and redistribution of the inorganic materials of the body; and these latter also are in the progress of transformation allied in such a manner with the excrementitious organic substances, as gives every probability to the opinion that it is

necessary they should be renewed in the food just as much as it is necessary the nutritive substances themselves should be supplied for the growth and waste of the body.

"Perhaps, however, it is not necessary to the life of an animal, though essential for its perfect health, that the whole of the inorganic materials used in the body should be supplied in every successive portion of its food. It is argued that in the case of the salts of alkaline bases united with the phosphoric and chloric acids, the vital principle possesses the power of retaining them in the fluids of the body, and thus using over and over again the same materials in performing the same functions. We want precise facts to demonstrate the extent to which this husbanding of the supplies may be safely carried without materially deranging the health of an animal; and such facts will, doubtless, be soon elicited, now that physiologists are well laid on the track of them.

"In his work on 'Chemistry applied to Animal Physiology,' Liebig has argued that in the graminivora the organism collects all the soluble phosphates produced by the metamorphoses of tissues, and retains them for their peculiar uses in the body. But when he argued thus, the fact was not known that the juices of the flesh and the blood contained so large a portion of these salts, nor was it conjectured that they fulfilled in the body functions so important as in his later work he attributes to them. His reasonings also, being deduced wholly from chemical considerations, may be open to much doubt. On the other hand he argues, and on an array of facts which make his conclusions extremely probable, that the greater part of the biliary secretion of graminivora being derived from the food, and soda being its essential ingredient, a daily supply of soda in the food is indispensable.

It seems to me, however, that knowing as we now do the chemical composition of the food of animals, and also that of the fluids and solids of animal bodies, many facts which were once very obscure are now explicable on the supposition that a supply of many inorganic materials is needed in every portion of the food. It has been proved that animals will not thrive if they be fed on certain kinds of food, which only differ from that which renders them vigorous in the absence of certain saline ingredients. If a large portion of sugar be substituted for other materials in the food, an animal will languish, and eventually will die. A dog is known to die when fed on fine flour only, but it will live if the bran also be added to the flour. It is a familiar fact to housewives that chickens will not do well on bread, or on cheese curd. But if these things be mingled with bran and potatoes, which furnish the salines that are deficient in the bread or curd, the chickens grow vigorously. So the breeders of pheasants find that it is necessary to place the young birds where they have access to abundance of insect and vegetable germs, or otherwise to provide them with large quantities of egg, which being the substance out of which chickens are formed, contains of course, in fitting proportion, all the inorganic materials necessary for the living functions of a chicken. The most remarkable fact of this kind is the occurrence of that dreadful disease, scurvy, in seamen and others, who are for a long period compelled to feed on biscuit made of fine flour, and salted meats, without any admixture of fresh vegetables or roots. This disease weakens the whole powers of life, and induces a tendency to decay in every part of the frame, which shows itself first in hæmorrhage and sloughy ulceration of the gums. While the body is affected with this state every other kind of disease which may arise in it becomes altered in its character by the peculiar constitutional weakness, and it is also much more susceptible of disease of every kind. A similar kind of derangement of the health has frequently been observed in workhouses and gaols, where a faulty system of diet was pursued; and in London and other large towns much of it has been seen in the last two years from the difficulty under which the poor lay of procuring potatoes, or other fresh vegetables to supply their place. Now the remedies for this state of constitution at once demonstrate its cause; they are, fresh meat and fresh vegetables, or preserved vegetable juices, and brown bread. In fine flour is but a small portion of saline matter, and in the process of salting almost all the salines are removed from meat. The grain of wheat contains a plentiful supply of phosphates; but of these more than half reside in the husk or skin; the taking away, therefore, of the bran, which is one-seventh of its weight, diminishes the saline ingredients one-half. But what is it that is wanting in the remaining fine flour to render it capable of furnishing all the salines wanted in the body? Add potatoes to the diet, and scurvy will disappear. Now, if we examine the quality of the ash of potatoes, we shall find that its proportion of phosphoric acid is very small in comparison with the amount of the alkaline bases of potass and soda, the former especially. Fine flour contains about one part of phosphates in 280. Potatoes contain about one per cent. of ash; but only about one-tenth of this consists of phosphates. Suppose, therefore, that five pounds of potatoes be substituted as food for one pound of fine flour, the quantity of phosphoric acid in both would be nearly the same. But in the potatoes there would be eight or ten times the quantity of potass which there would be in the flour. The

same fact holds good with respect to most other roots and succulent vegetables, and especially to lime, orange and other juices of fruits which have been found useful as antidotes or preventives of scurvy. Soda cannot be wanting in the food, for large quantities, too large perhaps, are always used in bread and in biscuits, and it seems that phosphoric acid is not wanted in the remedy. The deficiency seems to be potass in this instance, for that is the only thing needed by the body which exists in the remedy in more abundance than in the hurtful diet.

"It might be inferred from this, that perhaps for the ulterior uses of the saline ingredients, nature has the power of retaining a certain quantity of the phosphoric acid; but that a supply of alkaline bases were needed for the healthy accomplishment of the process of digestion. It is in accordance with all the analogies of nature to believe that the ingredients of the food, which are needed in the subsequent changes it undergoes, are needed also in the first, viz., that which is effected in the stomach. As yet, the chemistry of the digestive process is not without much obscurity: but enough is known to make it probable that the saline constituents of the food are not without influence in determining the changes it undergoes in the stomach; for in all the transformations which can be induced in the food out of the body, these ingredients are known to have a marked effect on the nature of the products.

We are perhaps not entitled to infer from the composition of that food—milk—which nature has destined for the support of the young animal, that the same ingredients it contains are necessary, in the same quantity, in the food of older animals. The young animal adds to the substance of its own frame a greater proportional amount of its food than the older animal, and therefore of course requires a larger amount of the saline ingredients of the bones and flesh. And here I may just stay to remark, that this quicker increase in the young animal is a fact which does not appear to me to have received all the practical comment it deserves. A calf will drink in the first six weeks of its life an average daily quantity of milk amounting to four gallons. In this quantity is contained four pounds of solid food; so that in the six weeks it will consume 168 pounds. In this time it will add, if it thrive well, 80 pounds to its weight—that is, half the whole quantity of its food. But a grown ox will consume in one week 168 pounds of soluble nutriment in its food, and will increase in weight only one stone, or one-twelfth of the weight of the food. The quicker ratio of growth in a young animal continues for a long period; and for as long as it does continue, it is evident that it will repay the farmer better for good food than an older animal. Those who weigh the bearing of this fact will see the absurdity of stinting young animals. I could wish that some one of our members would take up this suggestion, and bring it at large before the notice of the club. But though by reason of their quicker increase the young animals require a larger proportion of salines in their food, yet it seems to me we may fairly conclude that what we find in milk is essential, in proper quantities, in the food of all animals. Milk contains, for every 100 pounds of the fluid, about half a pound of salines; and as there is in the 100 pounds of fluid about 10 pounds of solid matter, the proportion of ash in the latter is one-twentieth of its whole weight. I extract the analysis of this ash from the lectures of Professor Johnston. It consists of

Phosphate of lime	23·1
Phosphate of magnesia.....	4·2
Phosphate of iron	0·7
Chloride of potassium	14·4
Chloride of sodium	2·4
Free soda	4·2
	In 49·0 parts.

"I think the composition of milk should always be kept in view, when we are endeavouring to provide in the food of animals what will best preserve them in health. An attention to its composition is also, of course, very important to the farmer in another point of view; for as the profit of a dairy farmer depends on the quantity of his produce of milk, it is in vain he will look for a large return of it from food in which the whole of its saline constituents are not found. It cannot fail to present itself as a very striking fact to every mind, that the saline constituents of milk are so nearly in accordance with those formed in the flesh and blood of animals. In the various plants on which herbivorous animals feed, the saline constituents are of various kinds and in differing quantities; but the unfailing agency of the vital principle separates for the use of the young the essential requisites of its functions as accurately as it does those which are wanted for the body itself which it immediately inhabits. Now we must bear in mind that in their native freedom the animals we have subjected for our use have access to much variety of food. An unerring instinct will guide them to choose such kinds as are most fitted to their organic economy. But when under our care they are confined to special plants —first to one kind and then to another; and we see the result in an increased state of mortality among them. I do not mean that the failure of a due supply of salines is the only, or the main cause of the losses sustained in our flocks and herds, but I conceive it is one not unimportant element in the

general mischief. It is not necessary that I should state in detail the inorganic constituents of the various plants cultivated on our farms. Such a course would take up too much of your time. I will confine myself to a few general remarks as to the differences which exist between the different classes of plants used as food—grain grasses, both moist and dry, succulent vegetables, roots, and lastly, straw and haulm.

" Grass and green herbs are the natural food of horses, cattle, and sheep; and in these one might naturally look for a full supply of every needful ingredient. We may conjecture, too, from the quantity in which they are found, what we should add to other kinds of food which are deficient in some of the ingredients of grass.

" The ingredients of plants are not only dissimilar in various kinds, but different parts of the same plants have different constituents as well as different quantities; and on various soils the same plants contain different proportions. Yet in all plants the ingredients are but few. They are potass, soda, lime, magnesia, alumina, silica, chlorine, phosphoric and sulphuric acid, iron and manganese, and alumina. From what I have stated, it will be apparent that the phosphates and chlorides of potass and soda, and iron, are those which may be supposed to have most influence on the health and well-doing of cattle.

" Hay, clover, sainfoin, and trefoil contain as much as from 5 to 10 per cent. of their dry substance of these ingredients. The quantity of potass is on an average in them perhaps one-fifth of the whole, the soda one-twelfth, the phosphoric acid one-fifteenth, and the chlorine one-twentieth. Now, as a full grown cow will consume at least 250 pounds of hay in a week, she will use in that time from 12 to 25 pounds of these various salines, in which would be from two to five pounds of potass —an ample supply for the use of her own frame and for the production of milk. The soda, chlorine, and phosphoric acid are also ample enough for all possible uses.

" Wheat, barley, oats, beans, peas, and rye contain, on an average, about 2 per cent. of salines, and oilcake as much as 4 per cent. Of dry hay only about half its substance is digestible, and of grain from 70 to 90 per cent. is composed of nutritious substance. If an animal is fed on grain, therefore, a less quantity will be required; and as the proportion of salines is also less in grain, an animal fed on it will obtain very much less of these constituents of food. Moreover the salines are not of the same, or nearly the same quality in grain as in grass and hay, and the proportion of the various substances is still more different. In green herbs there is potass and soda more than sufficient to neutralize the mineral acids; but in grain nearly the whole of the alkaline bases is united with phosphoric acid, while chlorine is almost wholly absent, and frequently there is absolutely no soda found.

In succulent vegetables, in cabbage, rape, the leaves of turnips and mangold, &c., the quantity of salines is very large. It amounts to 2 per cent., which is equal to 12 or 16 per cent. on their dry substance; and consists of an abundant quantity of alkaline bases, partly in union with vegetable acids, and partly with phosphoric and sulphuric acids and chlorine. It is especially remarkable that in the leaves of turnips and beet a very large proportion of chloride of sodium (common salt) is found. In bulbous and tuberous roots, used as food, there is a proportion of ash not much less than that in succulent vegetables, and its composition is nearly the same. Not only do these two descriptions of food contain all the salines the body can want, but the probability is, that frequently they contain more than conduces to the health of animals.

" Straw and haulm contain from 4 to 7 per cent. of mineral ingredients; but in the straw of white crops the quantity is the least, and one-half of the whole consists of silica—a mineral which, so far as we know, fulfils no use in the animal economy. The haulm of beans, peas, and vetches is richer in minerals, and silica is not found in it in considerable quantities. As compared with hay, the straw of white crops is very deficient, especially in alkalies; the straw of wheat and barley containing but a small proportion of potass, and commonly almost no soda; and the straw of oats, though supplied with potass liberally, is also seldom furnished with soda. All varieties of straw contain but an insignificant quantity of chlorine, which we have seen is so necessary for the animal frame, but have phosphoric acid in sufficiency. On the other hand the haulm of leguminous plants has very little phosphoric acid, but commonly possesses considerable quantities of potass, soda, and chloride of sodium.

" As I have before remarked, plants will not flourish unless they can collect the salines fitted to their nature. These are as necessary to them as to animals. It can never be a matter of doubt, therefore, that if certain salines belong to its nature, we may calculate confidently that any given plant will furnish fit food for animals. But it seems that both soda and potass are necessary to the animal economy—the former especially to the herbivora; and on the other hand, it seems that in vegetables one of these alkalies may, to a very great extent, supply the place of the other, and some plants naturally prefer one or other of them. And in one part of the plant—in white straw crops, for instance —soda may be present in the grain, but wholly

absent from the straw. Liebig has given analyses of various plants in the fourth edition of his work on the 'Chemistry of Agriculture,' which entirely demonstrate, that in countries far removed from the sea, potass often abounds to the exclusion of soda; and in maritime districts soda is found in variable proportions, sometimes to the almost entire exclusion of potass. Professor Way, in his paper on the analysis of wheat-ashes, found no proof of this mutual exchange of potass and soda; but in a subsequent paper on the analysis of the ash of turnips, he finds the fact as stated by Liebig confirmed. There is little of England which is not within reach of a supply of common salt, for it travels in vapour from the sea far inland, and falls in every shower; still, even in England, the straw and grain too of white crops frequently contain not a particle of soda. In the earlier stages of their growth, plants would seem to require a larger supply of alkalies than is wanted to mature their fruits. It is found that the grasses and cereal crops, when in flower, contain more salines than when they are ripe—the excess having returned to the earth. The quantity therefore in straw, as also in hay, must depend in great measure on their degree of ripeness when cut.

"Now I think it scarce admits of doubt that the health of cattle and sheep is deranged, and their feeding and milking produce lessened by reason of our giving food which is wholly unfitted to supply the saline matter which their natural functions require. Ripe grain and straw are not their natural food. We have seen that in the haulm of leguminous plants there is very little phosphoric acid. If cattle should be fed wholly on this diet, is it not certain their health must suffer from the absence of that substance? In straw of white crops, soda and chlorine may be absent, and in grain too. We might therefore be giving to cattle an apparently nutritious diet in straw, corn, and oil-cake, and throw the nutriment away because of the want of the necessary condiment. It is frequently seen that the winter stock of young cattle thrive ill on an apparently good diet of straw and cake. It is also seen that they will often do well on straw, with a small addition of turnips. The excess of salines in the turnips remedies the deficiencies of the straw, and the whole becomes a very wholesome diet. An attention to these facts, too, explains perfectly the apparently contradictory accounts we have of the influence of common salt on the health and well-doing of cattle and sheep. When the food is not deficient in that necessary article, its addition destroys its wholesomeness, and the animals thrive better on less nutritious food. I by no means intend to argue that all diseases of cattle spring from inattention to the facts I have stated; but I think many of the diseases they are subject to in the straw-yard, and in the early spring, when suddenly turned into different food, proceed from this cause.

"Practical experience has led farmers to the rule that a mixture of food is best; and science amply confirms the rule. What is now found the best feeding mixture? Cut straw, corn, and oil-cake, with a liberal mixture of turnip. Such an union provides all needful condiment with the nutritious ingredients of food. The same intention may be carried out by adding a portion of hay to the straw of young stock. But I venture to offer to you a suggestion on the use of hay for young stock, which is perhaps worthy of your careful consideration. The most terrible scourge of the farmer, in the way of cattle diseases, is black-leg. The nature of the disease is not obscure: it is a tendency to hæmorrhage and mortification, which unequivocally demonstrates the existence of a long preparation in the animal economy. The attack is sudden; but the causes must have been long in being. It attacks, often, many animals in the same herd. The cause must, therefore, be common to them. It is not influenced by seasons or by any epidemic poison. The cause must be in the food. It attacks equally the poorly and the highly fed animal; but its attacks are infrequent, except in the winter or in the early spring. It must, then, be the dry food. It does not commonly affect the cattle that have been kept wholly on straw; and often those which have been kept wholly on hay escape. But I believe the general observation of you all will bear me out in affirming, that it oftenest affects those cattle which have eaten most of hay and clover. We know that sheep will not do well long on hay. It is a familiar observation, also, that neat cattle do best on the greenest hay.

"When grain is highly dried it engenders disease in both horses and cattle; and hay that is subjected to a high degree of fermentation in the stack is in the same state as high-dried corn. Mouldy hay engenders disease, but not the particular state of the constitution which results in black-leg. From all this it seems to me most probable that the cause of black-leg is to be looked for in the common practice of heating hay in the stack too much. It may be asked, Why does not hay injure the older animals also? The answer is, that young ones are more susceptible of disease from unwholesome diet. That is a constant fact.

"You will attribute the more weight to these observations when I say they are more Mr. Robinson's than mine. He has not supplied all the defects of my paper, but he has been kind enough to furnish me with many hints; and when I asked his opinion on the question whether black-leg might not be accounted as a disease similar in

nature to scurvy, and have its origin in a deficiency of phosphates and chlorides of soda and potass in the food, he directed me to the point I have just addressed myself to, as the much more probable solution of the question.

"To return to our immediate subject, it would seem extremely probable that very many of the diseases of swine, and great waste of their nutritious food, are occasioned by our failing to give them such as contains the requisite salines. As long as you give pigs potatoes, turnips, or whey, they will not want any of the necessary ingredients of their blood and flesh; and seldom, perhaps, are these wanting in bran and pollard. But feed them on grains, and house-wash, and neither phosphates nor chlorides can be extracted; and often when you give large supplies of corn, there may be wanting both soda and chlorine. The pig secret of Mr. Huxtable perhaps may be explained on the supposition that the addition of a large quantity of turnips to the meal supplies the salines which are needed to make the meal itself fully nutritious, and to preserve that perfect health in the animal that alone makes the nutriment available. If straw, grain, dry hay cut very ripe, and thrashed rye-grass, be apt to have too little of the necessary salines, it is equally certain that roots of turnips, mangold and their tops, cabbage and rape, young vetch and rye, young clover, and in some lands grass too, are apt to have an excess over what is good for the health of animals. I have taken up already so much of your time, that I must confine myself to a very few observations on this important division of my subject. I refer you to the paper of Professor Way on the analysis of the ashes of turnips, mangold, and carrots, in the eighth volume of the 'Journal of the Agricultural Society.' He found that in mangold-roots was contained a large proportion of chloride of sodium (common salt): in one specimen the quantity was so large as 50 per cent. of the whole ash; and he calculates that an ox eating 1¾ cwt. per day, would consume in that quantity 7½ oz. of common salt. In turnips, too, the quantity of this salt is commonly considerable; and as the whole of the alkalies in both are united with either mineral or vegetable acids, their effect on the body is purgative. We cannot wonder, therefore, at cattle scouring while consuming some kinds of turnips and mangold; and it cannot be doubted that if these roots were always mingled with other food, in such proportion as not to derange the normal functions of health, the growth of cattle, and the fat, and the milk they yield, would be greater.

"Mr. Robinson, the Professor of Veterinary Surgery at the Cirencester College, has pointed attention to the fact that common salt, given in considerable quantities, has the effect of lessening the flow of milk in sheep and cattle. As the analysis of beet and turnips shows both in the tops and bulbs a large proportion of common salt, and as that quantity is very variable, it becomes no longer difficult to account for the contradictory opinions of farmers on the advantage of giving or withholding turnips from the milking ewes and cows. I believe it is in accordance with general experience that beyond a certain quantity swedes and mangold have an injurious effect on the flow of milk; but that moderately used they promote it. But the kind of land and manure will cause the quantity of salt in roots to vary so very greatly, that one crop may be highly beneficial and another equally injurious when given in large quantities. Though we have not so minute analyses of herbs, grasses, and succulent vegetables, grown on different land and under different circumstances, yet there can be little doubt that their saline ingredients vary as those of turnips and grain crops do. This difference in the amount and quality of the saline ingredients may perhaps account for one pasture feeding or milking better than another, and for the superior quality of the cheese made from certain lands. It is certain that milk varies considerably in regard to its saline ingredients, and the heaving of cheese is most probably connected with some influence of an excess of alkali in modifying the fermentation of the whey within the cheese. The richest lands are those in which alkalies abound, and on such pastures it is most difficult to manage cheese well.

"It is generally admitted now by all good farmers that the practice of confining sheep wholly to turnips is an unprofitable one. Eaten with straw and oil-cake the health of the animals is infinitely more secure, and the return much greater for an equal amount of food. In a paper in which an excellent observer and practical man, Mr. Pawlett, has recorded some experiments on the comparative feeding properties of roots when given to sheep, will be found facts which are quite at variance with general experience. We know that carrots contain more nutriment than mangold, and mangold more than swedes, and swedes than white turnips: yet Mr. Pawlett found that the order of their feeding properties was reversed in some of his trials. Those contradictory facts are inexplicable, except on the supposition that the saline ingredients of the nutritious roots injured the healthy functions of the sheep, and counteracted their otherwise greater feeding power.

"Imperfectly as I have executed my task, I trust you will think I have said enough to show how necessary it is for us to keep a constant watch over the mixture of the various kinds of food given to animals, so as never to have greatly too little or too much of saline matter in it. Fortunately nature

has not made it needful that we should be very exact, and the health of animals is kept good under a trifling deficiency or excess. I have confined my attention chiefly to the preservation of the health and well-doing of cattle and sheep, by avoiding the use of such food as might injure the health by its excess or deficiency of those salines which the body requires. To explain what tendency to disease the excess or deficiency of the several saline ingredients of food create, would have been a task beyond my power. I believe we are not in possession of exact observations which would enable any one to accomplish such a task satisfactorily. I have left untouched also another very important branch of the subject, viz., the inquiry how far, and in what cases of disease and illness, certain kinds of food would operate remedially by the agency of their peculiar saline constituents. My colleague, I have no doubt, will so acquit himself of his share in our common duty as to make the deficiency of my contribution, and it, the less regretted by you."

Mr. ROBINSON: I have listened with very great interest to the valuable paper which Mr. Greaves has just read to us. I entirely agree in the opinions expressed in it, and I think it would be difficult to place the subject in a point of view more likely to impress our practical farmers with a sense of its extreme importance. Such suggestions as I could offer to Mr. Greaves, he has done me the favour to embody in his paper; and I scarce know how I shall be able to add anything that may assist in the joint task we have undertaken. As Mr. Greaves has justly remarked, the knowledge we have attained of the saline constituents of the animal body is only very recent, and much still remains obscure in the uses they fulfil in its functions. There can be no doubt whatever that the salts found in the blood and flesh must be supplied in the food, and that any kind of food which is deficient in any one of them must induce such a change in the living functions as will lead eventually to serious disease. When administered medicinally, the neutral salts in large doses purge. They are not taken up into the circulation, but hurry the products of the digestive process through the bowels. When neutral or alkaline salts are given in smaller doses they enter the circulation; and it would appear that they quicken and increase both the secretion of the bile, and the excretory functions of the kidneys, and of the bowels too. It is therefore probable that as a larger supply of salines operates to stimulate to excess the digestive and excretory system, so in the quantities in which they are found in healthy food they serve to excite a due degree of activity in these processes. Though a liberal supply, therefore, may not be actually necessary to keep animals alive; yet perhaps abundance of saline matter in the food is needed to keep the assimilating and excretory functions in that degree of energy and vigour which it is so necessary for the farmer always to keep his stock in. Mr. Greaves has called your attention to the composition of milk. That is, no doubt, a perfect food; and all other food is most probably not quite fit to preserve the body in health which differs greatly in its saline ingredients from milk. Mr. Greaves has pointed out to you the general character of the saline constituents of the various kinds of food. It is a subject which we shall all be obliged to study now with diligence. Its complete elucidation will form one of the most precious gifts of the science of chemistry to the practical art of agriculture, and no less to the art of medicine. He (Mr. Greaves) has shown you that one or other of the salines found in the animal frame may be altogether deficient in certain descriptions of food, and that many kinds do not contain salines at all in the same proportion or quantity as milk, while others contain greatly larger quantities. The matter has so lately become the subject of study among observers of disease, that we are not able to say what special diseases, or tendencies to disease, are induced by the failure of supply of any ingredient necessary to health. Professor Playfair says that an animal kept on food from which phosphate of soda could not be procured would die of asphyxia. That is extremely probable. But before the deficiency of the phosphate of soda became so marked as to produce death in this sudden manner, it would, while yet existing in a less degree, create terrible derangements of the health. The same authority also says that scurvy is induced by deficiencies of phosphates. Mr. Greaves has argued that the peculiar state, known as scurvy, is due to a deficiency of potash in the food. But may not the character of scurvy be in essentials the same when either the one or the other ingredient is absent from the food; and may not its various modifications be due to the variations of the cause? The existence of what is known as a cachectic habit in mankind, and combined too with a hæmorrhagica diathesis, is very frequent when some of the peculiar characters of scurvy are absent. Many such derangements are relieved by change of food, and by certain saline medicines. We very frequently meet with the same morbid characters in cattle complaints. In post mortem examination of cases of blackleg, and in purpura hæmorrhagica of the horse, there is always found an exudation of the blood from its vessels into the surrounding tissues. The blood is always dark, turbid, and loaded with carbon. If the office of phosphate of soda in the blood be to hold, and afterwards to release from the lungs, carbonic acid, this appearance of the blood might very probably be conjectured

to have some kind of connexion with the deficiency of that salt in its composition. Such derangements, if brought on by the constant feeding on substances deficient in salts of soda, may be reasonably thought remediable by giving a portion of common salt with the food. This salt would decompose the phosphates of lime or potass actually contained in the food, and thus supply what was wanting. Mr. Greaves has called your attention to that terrible scourge of cattle, blackleg. From its similarity to purpura hæmorrhagica, and to scurvy, in many of its symptoms and morbid appearances, one might naturally expect it to have some affinity with those states in respect of its cause. It is a disease which has hitherto baffled all medical treatment, and all inquiries as to its specific cause. We do find, however, that it may be averted or prevented by certain changes of diet; and the question naturally arises whether it have not its origin in some defect or excess of the saline ingredients of the food which predisposes cattle to its attacks. I have certainly remarked very frequently that calves fed on turnips and hay were very liable to attacks of blackleg. Very frequently, where one part of the stock has died, the ravages of the disease have been stayed by simply exchanging the hay in their diet for barley straw. I may relate to you a very marked instance of this beneficial effect of changing the diet of calves, which lately came within my observation. A very eminent agriculturist, who farms a part of his large estates, has farms in Warwickshire and in Wales. At his farm in Warwickshire his calves are never visited by blackleg, but in Wales they are peculiarly subject to its attacks. At home they are fed wholly on turnips, straw, corn, and cake; but in Wales they have hay. The calves, from among which part have died of blackleg, in Wales, have been brought to the other farm, and the change has defended them from the disease. Mr. Greaves has shown to you, the analysis of hay proves that it contains all the salines necessary to the body. I imagine, therefore, that if the hay be the cause of blackleg, it must operate in some other way than by failing to yield phosphates and soda. Straw, which will sometimes remedy the disease, is often, as he (Mr. G.) has pointed out, deficient in these articles. It cannot be that hay contains an excess of salines; for when calves are pastured, the grass they eat contains more salines than the hay. I scarce venture to give an opinion as to the real cause, which may possibly reside in hay, but I think we should do well to bear in mind the suggestion of Mr. Greaves as to the heating of hay in the stack. I am not prepared to say whether that is the probable cause. There may be other principles in the hay that have an effect on the health besides the salines, or the empyreumatic products of a high degree of fermentation. A lower degree of heat may possibly generate products which are not always beneficial to the health of young animals; and all vegetable substances contain peculiar properties besides their saline and nutritive substances. Sometimes wholesome plants, grown in bad seasons, contain things injurious to health; and we know that new corn contains often a principle that is injurious, and which is dissipated by keeping. But I agree with Mr. Greaves in the opinion that analogy would lead us to believe high dried hay not perfectly wholesome; for it is certain that other things, when subjected to heat, become dangerous as articles of customary food to animals. I agree entirely in all that Mr. Greaves has said on the necessity of mixing various kinds of food. The practice is equally necessary for the preservation of health, and for the productiveness of animals. He has shown us that a food, such as corn, may contain abundance of nutriment, and yet that the materials of milk may be deficient in it. A food that will not yield milk cannot, I think, be permanently good for the health of cattle or horses. It is self-evident, that you cannot get milk without the necessary salines; and it seems almost as certain that without the salines which milk contains, the nutriment in food will not produce its full effect in yielding fat and flesh. Since the publication of the admirable work of Baron Liebig, we have all become aware of the advantages farmers would attain by adapting the kind of food to each particular purpose of producing fat, or adding to the size of an animal, or of yielding milk. The division which he makes of food, into such kinds as contain nitrogen and such as do not contain it, is exceedingly important. Flesh contains nitrogen, and the substances which contain it in vegetables are converted into flesh; they are, in fact, the same substances. But the great bulk of the food is wanted to supply the body with the source of animal heat. Such articles as sugar, starch, gum, &c., fulfil this last purpose. Then to yield fat, which also requires no nitrogen, these same substances are available; and also the considerable quantity of oil or fatty matter contained in all vegetables is used for the same purpose. Food should be varied, therefore; or much of it is used in waste. We should observe how nature begins with the young animal. The parent animal eats a food rich in non-nitrogenized substances—say, grass and turnips. She consumes most of these in her own frame. But part of them, and a greater part of the nitrogenized substances, she converts into milk. Milk is composed of casein, sugar, and butter. The proportions vary in different animals: in the cow the proportion is nearly equal, but in the mare and the ass the casein much exceeds the butter. The food of the cow usually contains only a

small proportion of nitrogenous substances, but the milk contains one-third of its solid substance of casein. That fact teaches us that the food of a young animal should be rich in nitrogen, unless we let it drink its natural food—milk. Mr. Greaves has directed our attention to the extreme quickness of growth in a young animal; it is a remarkable circumstance, and should always be borne in mind. In the natural state, calves would long receive food from the mother. If we would not stunt their growth, therefore, we should continue to them for a long period a food having the same properties as milk. Peas contain one-third of their weight of casein—a substance precisely similar, as Baron Liebig proves, to the casein found in milk. The whey of milk contains the saline ingredients; and if pea meal be added to it, a food is made which resembles milk to a certain extent. Oilcake, too, will furnish considerable quantity of the fatty matter that may replace the butter of the milk. I think it is of immense importance, as regards the profits of a breeder and rearer of cattle, that he should keep up from the beginning of their lives the quicker tendency of growth young animals possess. On observing this principle depends all success. I have known those who, by adopting such a system of rearing as I have been describing, have produced animals that, in regard to size, have been almost full grown at eighteen months old; and who have sent them to market fat at thirty months, and sold them at from £20 to £30 each. The plan of rearing on pea-meal is, I think, especially applicable to young colts; which in their mothers' milk do not get so large a proportion of butter, and do not require to lay on fat. I have for some years pursued this plan with them, and with great success. It is found that an animal will yield more casein, butter, or sugar in its milk, in proportion as its food contains more of one or other of the substances that yield them. A mare kept on beans or peas will give a milk richer in casein. I have a brood mare now with a foal, and I am feeding her with a view to increase the nitrogenous part of her milk; and as far as it has gone, my experiment seems to be attended with perfect success.

Mr. Walter Hollier had long been of opinion that the rearing calves on hay was the circumstance that especially rendered them liable to blackleg. He could not say what it was in the hay, whether its being too strong and nourishing for them or some other cause; but his experience had been enough to convince him that straw was the safe diet for them. In his father's time the calves on the farm he now occupied was always fed on hay. They were frequently ravaged by blackleg to a very serious extent. He had himself changed the system, and by keeping his calves on straw, and roots, &c., had been entirely free from the disease. Three of his neighbours, too, had changed their plan in the same way, and with a like result; while another who still persisted in giving hay was frequently subjected to loss from blackleg.

Mr. Greaves said that in steaming hay, unless care was used in wetting it properly, and avoiding too much or too long continuance of heat, it became burnt, and in every respect resembled hay highly mowburnt. He reminded Mr. Robinson that the calves of one of his neighbour's, which had been fed on hay so over-steamed, died off rapidly with blackleg, and that at his (Mr. R.'s) suggestion the hay was exchanged for dry straw, and that no further loss ensued.

Mr. Robinson remembered the circumstance, but at the time had not viewed the fact in the light he regarded it now.

Mr. A. Bass said that having some connection with the question of cattle disease through his secretaryship to the Cattle Insurance Society, he could very well appreciate the extreme importance of attending to every suggestion which had for its object the prevention of blackleg. It was the disease which of all others made insurance necessary. Mr. Robinson seemed to think that possibly the want or excess of salines might have something to do in causing the disease. Might not some salines be lost in the process of steaming? And in those other cases, where salines were deficient, might they not be supplied artificially.

Mr. Robinson supposed that some salines of hay might be steamed out, and unless the waste liquor were added to the food again, some necessary ingredient would be deficient. The case was like that of meat. If you boiled it in a large quantity of water, all the phosphates and chlorides were boiled out and remained in the broth. If you salted the meat too, the salines would be dissolved in the brine. This, Liebig had pointed out in his latest work. In such cases, and also where soda or any other ingredient was deficient, the addition of common salt to the diet of animals would render the food wholesome. When the exact properties of food was better known, he thought much might be done by adding, as a condiment, various salines.

Mr. Gretton had been accustomed to use steamed hay for horses. The hay was often burnt in the process, and he thought he had observed that the horses were apt to be less healthy when fed on it.

The President remarked that the paper which had originated a discussion, in which so much of useful suggestion had presented itself, would be more instructive when read and reflected on at home. He hoped it would be published.

ON THE CULTIVATION OF BARLEY.

BY M. M. M.

Both in this country in modern times, and in the great nations of antiquity, the growth of barley has been an object of considerable attention. Formerly not only was it a source of food, but "barley wine" was an early and favourite beverage. It appears to have had a season of growth distinct from the wheat, similar to the practice in this country, even where the climate is so different; and while the wheat in this country lies some nine months in the ground, and the barley but four, in early days we read of circumstances which took place "very early in the harvest, about the beginning of barley harvest." And we have the highest possible authority for knowing that, when the barley was so forward as to be "in the ear" in Egypt, "the rye and the wheat were not grown up."*

In the northern countries of Europe the liquor from barley seems to have obtained as great celebrity as the wine of the more civilized and grape-growing nations of the south, and the Celts seem to have engrafted it amongst their religious ordinances—doubtless the foundation of many of our social customs: and the narcotic hop is but a recent introduction, to which great objection was at first raised, on the ground that it would "spoyle the taste of drink."

The early productions of barley, we imagine, would not be very great. We find it does not thrive, for instance, on land newly taken from grass, such as we may suppose early cultivators had available; while on the old cultivated lands there would be by far too much lightness. And we know of no primitive state of the soil at all adapted to the light yet consolidated state of the land now necessary to grow such large returns as from fifty-six to sixty-four bushels per acre. We have no authentic estimate of productiveness, but its relative value to wheat appears to be as three to one; for in the state of famine marked out as to come when barley as a coarser kind of food, and consequently cheaper, would bear a high relative value, "A measure (*chœnix*, one and one-twelfth wine-quart) of wheat for a penny (*denarius*), and three measures of barley for a penny," sufficiently indicate the low value of barley.

The soil best adapted for barley is gravel on sand in a minute state of comminution, and it is most fully and vigorously developed where the red sandstone, the oolite, or the magnesian limestone underlie; but it is requisite, nevertheless, to have a certain amount of consistency imparted, and which, we think, is better adapted to the growth of that grain than any natural condition of the soil. If a winter and summer fallow, manured, in a proper soil, and in as good a condition as can be supposed necessary to a large crop of barley, were sown alongside of a turnip crop, eaten on with sheep, and sown with barley or a clover ley, with a measure of artificial consolidation and diffused manure, the barley on the two latter will be by far the most productive and the finest in sample. Inasmuch as excessive wetness is injurious to the barley in any stage, not only is porosity necessary in the soil, but the most perfect drainage indispensable to secure a full and perfect crop; and if the soil has the slightest tendency to become adhesive either by moisture or texture, the sowing of the barley must be at any hazard retarded until it is in a more favourable state.

The barley differs in its composition in a very considerable degree. Thus Sprengel makes it contain 7½ per cent. of magnesia, and Boussingault nearly 16 per cent., while Thomson only 4½ per cent. Again, while Boussingault finds it containing only 1½ per cent. of silica, Thomson obtains 29½ per cent., and Sprengel 50 per cent.; varying evidently according to the soil, climate, kind of grain, and probably, in some cases, difference of circumstances. For instance, the great discrepancy in the quantities of silica, and the known necessity of sowing barley on soils known to contain a large per centage of that ingredient, has induced Professor Johnston to infer that either Boussingault had analyzed the skinless barley, or that he had deprived it of the skin before that process. Taking the ash at 2½ per cent. of 2,1201bs. of the grain, and that of the straw at 6 per cent. of 2,650lbs., there will be left 213lbs. of ash, and the ingredients removed from an acre may be stated as—

	lbs.
Potash	17.53
Soda	5.24
Lime	16.92
Magnesia	9.22
Oxides of iron and manganese	2.14
Alumina	2.38
Phosphoric acid	25.76
Sulphuric acid	2.71
Chlorine	1.60
Silica	129.50
	213lbs.

* Exodus, chap. ix., ver. 31, 32.

We are aware that great variations in the quantity of silica will take place even in the variety of barley alone. When the kind known as the "Chevalier" was first introduced, it manifested a strange disposition to lodge, *i.e.*, to lie flat down upon the ground before the seed was matured. We subjected the straw to analysis, and found the Chevalier to contain a much less proportion than the ordinary and upright growing barley. Hence we inferred that there existed in the variety either a tendency to take up the other materials in its composition, or an appetency for it greater than the conditions of the soil could supply; for we found that the poorer and more sandy the soil, the less disposition to lodge was manifested by the variety. The components of barley account for its success on soils where bones, and especially dissolved, or rather bones rendered soluble, are applied. We have observed a clear gain on poor soils, of one quarter per acre, where the soluble bones were used, and where so much free phosphoric acid exists in the soil. A crop which contains 5lbs. per acre of phosphoric acid more than wheat, and 6lbs. more than oats, clearly indicates the free application of phosphoric acid to the soil. Again, the wonder ceases that the barley succeeds well on the limestones, when it is considered that it requires a larger quantity of lime than even wheat, to which crop it is known to be so necessary.

Sir Humphrey Davy gives the proximate organic elements of barley as follows:—

Mucilage or starch	790	parts of 1,000
Saccharine matter.....	70	— „
Gluten, or albumen.....	66	— „

Taking the analysis of the starch at C. 44.0, H. 6.2, and O. 49.8; the sugar at C. 44.92, H. 6.11, and O. 48.97; and the gluten at C. 54.75, H. 6.99, O. 21.93, and N. 15.71, we shall find what we have not been able to see stated in any work on agricultural chemistry, nor any work whatever, that barley contains—

Carbon	41.51
Hydrogen.....	5.78
Oxygen.....	44.21
Nitrogen	1.03
	92.53

The ash of barley is estimated by Sassure at 18.0 per cent.; Boussingault at 2.4; and Kochlin at 2.7. The mean of these, or 7.7 per cent., would as nearly represent the fact as is necessary for all practical purposes. The quantity of nitrogen appears to be very great, and we could hardly imagine any quality of barley so good as to admit of so large a proportion of nitrogen; still we are aware that the early specimens of Norfolk barley might have a larger proportion of gluten than others, as the experiments of Hermbstadt have proved that as much of a margin exists as from 9 to 34 per cent. Much doubt has since been thrown, we are aware, on the statement by Mr. Lawes and others; and many chemists have attempted to throw discredit on the analyses of Davy. With all respect to later chemists, we must say, we have never yet been able to see one chemical fact of Davy's overturned, far as we are from supporting many of his hypotheses founded upon them; and we need only name his unqualified recommendation of unfermented farm-yard manure as an instance.

The varieties of barley have more to do with soil and situation and climate, by far, than is generally imagined. All kinds are doubtless best if prepared in the way we stated, viz., by the intervention of artificial grasses or turnips, and their consumption by sheep. But the "bere or bigg" is a hardy variety, fitted only for moor-land districts, where they can get no other to maturity; but the grain is too small and "husky" to be of use for malting. The Chevalier will grow a fine malting sample free from flints (so common in the ordinary varieties, and so objectionable to the maltster), on the poorer sands, and is less successful as regards bold and fine grain. The "battledore" is a flat-headed and productive barley, but more of a grinding than malting quality, and more adapted to clay soils, unfavourable generally to barley cultivation.

The "annat" variety has been lately introduced from Scotland, and appears to possess the fineness in quality of the Chevalier, without its lodging disposition; but has not so full and bold a sample.

The quantity of seed varies from ten pecks to three bushels per acre, being usually sown by the drill, and equally covered over the surface. The former quantity is more general; and the disposition to tiller is much less than in the wheat, when any mode of broadcast sowing is adopted, as is the case when the ribbing-plough is used. The preparation of the land consists in ploughing after the sheep as rapidly as possible, and preventing their rich droppings of tail and fleece from being evaporated by the air, or washed away by the rains. The plough seldom goes deeper than a few inches, say four to five, as it is found not desirable to cover the droppings from the sheep too deeply. This is allowed to pulverize as long as the season will admit; and when the weather becomes mild and genial in the month of March, Finlayson's harrow or Kirkwood's grubber are passed over the clods, harrowed and rolled, if necessary, to break them up. An old-fashioned, and not very bad plan, is to plough a second time, and so fit the soil for the best possible reception of the seed.

It is somewhat of an anomaly, that while the

wheat is doctored *ad nauseam*, the barley is invariably neglected, though the smut or black ear is making sad ravages in every crop year after year.

Attention to the loss has been made by various hands. Mr. Hawking, of Linton-on-Ouse, adopted the following recipe:—He made a solution of ammonia (carbonate), and applied it more to invigorate the germinating process of the seed, and to make it more rapid, than with a view to remove the disease. The following year he adopted a similar process as regarded his barley, and first washed it, then steeped it, 24 bushels in quantity, in a solution of one pound of arsenic and half a pound of pearl-ash, and drilled it with quick-lime. He also tried some without any solution; and the result was that when the head shot forth, there appeared to be something like one-third less of smut or diseased heads, amongst that which had been washed, than there was among that which had been drilled without any solution being applied to it.

Too often, in the hurry of spring, the necessary attention is not paid to preparations of the seed barley. There can, however, be no doubt that some application might be devised, which would as certainly prevent the black head in barley, as the smut in wheat; but what it may be, experience has scarcely settled.

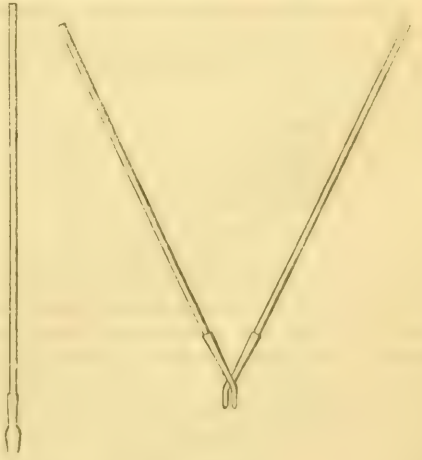
Although the disease is becoming very extensive, it seems to prevail more in the north than in the south; and it appears to be generally understood that seed brought from the southern counties, and carried to the northern, is far less subject to the smut for the few first sowings, but that ultimately it becomes as liable to be affected by the disease.

Connected with this change of seed is a great improvement which may be effected by a change of climate. The climate of the south is evidently more adapted to the vigorous and full development of the grain for the purposes of malting than the north; and thence, as any kind of grain takes a certain amount of time in acclimatising, the full development of fine seed-corn is, to a certain extent, kept up for two or three years.

We know farmers who have improved the general produce of their farms by some two or three shillings per quarter, by purchasing the finest samples from Mark Lane every second year.

As soon as the barley is sown, it is harrowed, and rolled generally, unless the soil is so very light as to be affected by the wind, when the rolling is often dispensed with. If the ribbing-plough is used, the harrows must follow the sower, lest a large fall of rain should prevent the harrowing process from going on, and leave the seed exposed. When the drill is used less care need be exercised, as the best drills are so constructed as generally to effect a cover of the seed. One harrowing is usually given before the small seeds which invariably accompany the barley. These are sown either broadcast, or by a very ingenious and efficient machine which we have seen manufactured by Mr. Crosskill, of Beverley, and which consists of a long cylinder, with holes at a distance of some four inches, and in which, when in motion, a roller studded with brushes is made to revolve. These regulate the discharge of the seeds; and even rye-grass may be sown with the utmost regularity, and in the most windy day imaginable. Without this or a similar instrument the sowing is sometimes necessarily delayed until the barley has germinated, and then it cannot be accomplished until it has got grown so far up as to cease to be tender. The roller then can only be used; and though we have occasionally harrowed the seeds in when the barley was grown up, we disapproved of the practice, as it wounded the corn and made many of the stems turn a sickly yellow. Some farmers always sow the red clover where it is intended to succeed after the barley has come up, with a view to prevent its too rapid progress in the barley.

The next process is hand-weeding. This is usually performed in the month of May. The thistles and the docks are the chief weeds which infest it, and these are eradicated by different instruments. Some use a spade-like contrivance for the purpose; but as this only separates the roots, it does not prevent their rapid growth subsequently. By far the best mode is to pull them up by the roots. The instrument used most successfully for this is provincially called "Neps." We have attempted to give an idea of both these extirpators:



(Thistle Spade. (Neps.)

The question at harvest-time is, how the barley is to be harvested, to get it rapidly out of the way

of rain, and of the bleaching effects of exposure to the sun. The clover sometimes progresses the fastest when the barley grows the slowest; and in this case, if the whole were bound up in sheaves after the scythe, the clover would be so long in drying, that the sheaves must inevitably be a long time exposed to the weather. Hence, if the weather is sunny and bright, and the prospect of rain distant, it is sometimes allowed to lie a few days in the swathe; and if such a season continues, it is very successful and proper; but if rain should supervene, the barley will be speedily spoiled.

Nothing can exceed the slovenliness, waste, and reckless exposure of the mode adopted in the south-west of England, of never tying it up in sheaves. The wonder is, that any barley fit for malting is ever secured; and the same care ought to be exercised in harvesting barley as is observed in preparing any other kind of grain for the market, except, perhaps, that the "hooding" of the sheaves is unnecessary.

Manure is not usually applied to barley directly, because it is found that it answers better the second year after the direct application of manure than the first. This clearly indicates what is well known to be the fact—that stimulating manures ought not to be applied to this crop, and that a more cautious supply of nitrogenized matter is indicated than where greater luxuriancy of straw is required.

It is only on some rare occasions when any manure is required, and on these a mineral manure ought to be preferred.

The trials with the nitrates are generally of a favourable character. On a light, friable soil, with a chalk subsoil, in Surrey, Mr. Barklay, with 1 cwt. per acre, obtained a crop of barley of 55 bush., against one of 44½ bush. where no manure was applied. In Northumberland, Mr. Jobling, on a strong turnip soil, applied the same quantity, and obtained by it a produce of 59 bush. per acre, over 47 bush. without any dressing; while in Suffolk the Hon. H. Wilson, after the partial failure of a turnip crop on a poor sandy soil, obtained 32 bush. per acre, against 18 without manure.

Professor Johnston gives a special manure for barley, which we have not tried nor seen tried. It is formed precisely of the inorganic elements of which the barley by analysis is found to be composed; and hence, if applied in the same degree of fixation as the barley requires, it will be useful. The quantity given is equal to a full crop.

	Lbs.
Bone-dust, 150lbs.; with sulphuric acid, 75lbs.	225
Carbonate of potash, dry	20
Carbonate of soda, dry	14
Carbonate of magnesia	16
	275

We may, however, in farming, observe that, so far as our experience goes, we have found our crops of barley increased by some quarters per acre since we dissolved the bones we used in sulphuric acid; and that the potash and soda will be useful, and the magnesia also, when the soils are destitute of that material, there can be no doubt.

Sowerby, Thirsk, April 27, 1848.

THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Weekly Council was held at the Society's house, in Hanover Square, on Wednesday, the 26th of April: present, Mr. Raymond Barker, in the chair; Mr. Almack; Mr. Burke; Mr. G. Dyer; Mr. Freebody; Mr. Brandreth Gibbs; Mr. Fisher Hobbs; Mr. Hudson, of Castleacre; Mr. Kinder; Colonel Mac Douall; Mr. Reynolds Solly; and Mr. Tweed.

Influenza among Horses. — Colonel MacDouall informed the Council that a most simple and effectual mode of treatment for the influenza amongst horses (exhibiting itself by a severe cold, with inflammatory affection of the nostrils and lungs) had been adopted, with unvarying success, by the Veterinary Surgeon to the 2nd Life Guards, the details of which Colonel MacDouall hoped, at a future meeting, to be able to lay before the Council; in the mean time, he might state that the plan consisted in keeping the bowels of the horses gently open, by administering one-fourth of the usual dose of medicine on four successive days, and, at the same time, in making such arrangements (by means of hay soaked in hot water, or otherwise) as would cause the horses continually to breathe the steam of hot water. The effect of this inhalation of aqueous vapour was, to keep the mucous membrane of the breathing organs in a state of continual discharge, by which the air-passages were kept free from accumulation, and the inflammatory symptoms rapidly removed. Not a single horse affected with this disorder had been lost in the regiment since the old system of bleeding, blistering, &c., had been discontinued; and the plan Colonel MacDouall then referred to had been adopted, and recovery was generally effected in a few days.—Mr. Hudson, of Castleacre, having about seventy horses on his farms, had constant opportunity of observing the nature and progress of this distemper, and his experience fully corroborated the statement of Colonel MacDouall. Mr. Hudson had found the most successful treatment to consist in allowing rest to the horses, in giving them cordial balls, and in placing hot bran-mashes in their mangers; and, in order to promote perfect recovery in the horses laid up with the complaint,

it had been his practice to allow them to remain for a fortnight or three weeks quiet, and without work.

Miscellaneous Communications.—A paper from Mr. Wagstaff, of Gordon Castle, illustrating the principles and advantages of axles, wheels, and drags, of his invention, included in the construction of a cart which the Duke of Richmond had entered for exhibition at the York meeting of the Society in July next.—A statement from Mr. Biddle, of Grosvenor Park, Camberwell, of the application of wind as a moving power for machinery, in his Æolian Engine.—A suggestion from Mr. Bullock Webster, that drains on strong clay subsoils, at various depths, should be inspected at this season of the year, and the results reported.—A communication from Mr. Brammell, of Newcastle-upon-Tyne, on various refuse substances produced in chemical works, and adapted for the purpose of furnishing manuring elements to the soil.—From Mr. Nutt, of York, a letter, suggesting prizes for poultry at the ensuing York meeting of the Society.

The Council ordered their thanks for these communications, and adjourned.

A Monthly Council was held at the Society's house in Hanover Square, on Wednesday, the 3rd of May: present; The Earl of Yarborough, President, in the chair; Earl of Egmont; Lord Southampton; Lord Bridport; Lord Portman; Hon. William Henry Drummond; Hon. Captain Howard; Hon. Charles Compton Cavendish, M.P.; Sir John V. B. Johnstone, Bart., M.P.; Mr. Raymond Barker; Mr. Barnett; Mr. Bennett; Mr. Blanshard; Mr. Bramston, M.P.; Mr. Brandreth; Mr. Burke; Col. Challoner; Mr. F. Cherry; Mr. Christopher, M.P.; Mr. Evelyn Denison, M.P.; Mr. Druce; Mr. Ellman; Mr. Garrett; Mr. Brandreth Gibbs; Mr. Grantham; Mr. Hamond; Mr. Harvey; Mr. Hillyard; Mr. Fisher Hobbs; Mr. Hudson, of Castleacre; Mr. Jonas; Mr. Kinder; Mr. Miles, M.P.; Mr. Milward; Mr. Pusey, M.P.; Professor Sewell; Mr. Shaw, of London; Mr. Shaw, of Northampton; Mr. Shelley; Mr. Robert Smith; Mr. Thompson; Mr. George Turner; Mr. Thomas Turner; Professor Way; and Mr. Wilson.

Mr. Charles Burrell, of Thetford; Mr. Charles William Strickland, of Boynton, near Bridlington; and Mr. A. C. Birchall, of Darlington, were elected Members of the Society.

Finances.—Mr. Raymond Barker, Chairman of the Finance Committee, reported that on the last day of the month of April just ended, the invested capital of the Society stood at £9,889 stock in the public funds, and that the current cash balance in the hands of the Bankers was £1,362. He also laid on the table for the information of the Members the special balance-sheets, showing the state of the funded property, and current account of the Society for the quarter ending on the 31st of March last.

Council Meetings.—Mr. Miles, M.P., having called the attention of the Council, agreeably with the notice to that effect which he had given on a former occasion, to the great inconvenience attending the day on which the Council Meetings had been hitherto held, both to Members of the Society in either House of Parliament, as well as to others whose engagements in the country oblige them to make a special journey to London for the purpose of being present at those meetings, it was moved by Lord Portman, seconded by Mr. Geo. Turner, and carried unanimously, That after the current month the day of meeting for the Council should be Tuesday, instead of Wednesday as heretofore; the hour of assembling, namely, 12 o'clock, remaining unchanged.

York Meeting.—Sir John Johnstone reported on the part of the General York Committee their recommendation that the Council Dinner, to consist of a number of persons not exceeding 300, should take place in the Guildhall; and that the Lectures should be delivered, and the official business of the Society transacted, during the meeting, in the De Grey Rooms, in that City.—Mr. Pusey reported, on the part of the Journal Committee, their recommendation that two Lectures should be delivered before the Members of the Society and their friends during the week of the York Meeting; namely, one on the Tuesday, by Professor Johnston, of Durham, on such subject connected with the application of Chemical Science to the improvement of Agriculture as may be arranged on communication with that gentleman; and the other on the Wednesday, by Professor Simonds, Lecturer on Cattle Pathology in the Royal Veterinary College, London, on the application of Veterinary Science to the Anatomy, Physiology, and Diseases of Domesticated Animals.—Colonel Challoner reported, on the part of the Trial of Implement Committee, their satisfactory progress in carrying out the wishes of the Council in reference to the construction and application of such a force-resister for the trial of machinery at the York Meeting, as would be efficient in its employment and at the same time economical in purchase.—These reports were respectively confirmed; and, agreeably with the Report of the Chairman of the Journal Committee, it was unanimously agreed that Professors Johnston and Simonds should be requested to favour the Members of the Society with the lectures proposed to be delivered by them at the York Meeting.—Lord Portman, having called the attention of the Council to the desirableness of throwing open the Show-yard on the Wednesday evening after the Judges of Stock have completed their awards, the Council entered fully into the discussion of that question; and decided that the Show-yard should be open on that evening, after the Judges had made their awards, to all parties on the payment of £1 each, with the exception of Governors and Members of the Council, who would be admitted on the payment of 2s. 6d. each.—The Secretary having reported to the Council the replies he had received from the various Railway Companies throughout the kingdom to the communication he had made to their respective Boards of Directors, as directed by the Council at a former meeting, on the motion of Mr. Brandreth, seconded by Mr. Raymond Barker, the following resolution was carried: "That, in order to check any improper advantage being taken of the handsome and liberal conduct of the Directors of the different Railway Com-

panies, by exhibitors sending to the Show several implements constructed upon exactly the same principles, the Council hereby determines only to ask the Directors of the Railways to allow Implements to be conveyed at *half-prices* each way, namely, to and from the Show; and that the Secretary be directed to make this request on behalf of the Society."—The following Committees were appointed for the recommendation to the Council, of Judges to be selected from the nominations sent in by Members of the Society to the Secretary on or before the 22nd instant; namely: Committee for *Judges of Implements*—Lord Portman; Colonel Challoner; Mr. Miles, M.P.; Mr. Shelley; Mr. Thompson; Mr. Fisher Hobbs; Mr. Brandreth; and Mr. Shaw (London). Committee for *Judges of Stock*—Lord Portman; Mr. Shaw (Northampton); Mr. Hudson (Castleacre); Mr. Brandreth; Mr. Druce; Mr. Shaw (London); and Mr. Kinder.

Country Meeting of 1849.—Mr. Raymond Barker, Mr. Brandreth Gibbs, Mr. Kinder, and Mr. Shaw, the Committee who at the request of the Council had made a personal inspection of the localities placed at the disposal of the Society for the purposes of the Country Meeting of 1849, having presented their report on the various points connected with the qualifications of those localities, that report was read, and all the various memorials, plans, and other documents received from their authorities submitted at the same time to the Council. The following gentlemen forming deputations to the Council were then received, viz., The Earl of Leicester (Lord Lieutenant of the County of Norfolk), Hon. E. K. Coke, M.P., Sir John P. Boileau, Bart., Mr. Wodehouse, M.P., the Deputy-Mayor of Norwich, Mr. Thompson (Mayor of Bury St. Edmunds), Mr. Colvin (High Sheriff of the county of Essex), Sir John Tyrell, Bart., M.P., Sir E. N. Buxton, Bart., M.P., Mr. Cobbold, M.P., Mr. Hardcastle, M.P., Mr. Waddington, M.P., Mr. Bunbury, M.P., Mr. Bennet, M.P., Mr. Burroughes, Capt. Du Cane, R.N., Capt. Skinner, R.A., Mr. Willett, Mr. Bacon, Mr. Barwell, Mr. Sultzer, Mr. Betts, Mr. Bailey, Mr. Gedge, Rev. D. Gwilt, Mr. Gayford, Mr. Goldsmith, Mr. Cotton (Chairman of the Essex Quarter Sessions), Mr. Hanbury, jun., Mr. Parker (Chairman of the Chelmsford Committee), Mr. Baker, of Writtle, Mr. Beadel, Mr. Mechi, of Tiptree, Mr. Overman, Mr. W. Baker, Mr. Law, Mr. Grove, Mr. Meggy, and Mr. Biddell;—and having furnished, through the President, detailed statements connected with the peculiar advantages of their respective localities in the Eastern Counties, they received the best thanks of the Council for the favour of their attendance on that occasion. The deputations having retired, the Council proceeded to the various points of the discussion connected with the particular place at which the Country Meeting of next year should be held, when it was finally decided, on the motion of Mr. Hamond, seconded by Mr. Harvey, that the City of Norwich should be the place of such Meeting.

The Council then agreed to the House List of the Council to be recommended (agreeably with the Bye-Laws) to the General Meeting of the Society to be held on the 22nd inst., at one o'clock, and the President having intimated his intention of directing a Special Council to be summoned for Friday, the 19th inst., at one o'clock, for the purpose of agreeing to a Report to that Meeting, the Council adjourned to their Weekly Meeting.

A Weekly Council was held at the Society's house in Hanover-square, on Wednesday, the 10th of May. Present—Mr. Thomas Raymond Barker, in the Chair; Hon. Capt. Dudley Pelham, R.N.; Hon. H. W. Wilson; Sir Matthew White Ridley, Bart.; Sir John V. B. Johnstone, Bart., M.P.; Mr. Almack, Mr. John Raymond Barker, Mr. Beale Browne, Mr. Bosanquet, Mr. Burke, Col. Challoner, Mr. Fuller, M.P.; Mr. Baskerville Glegg, Mr. Hyett, Mr. Kinder, Col. Mac Douall, Mr. Milward, Mr. C. E. Overman, Mr Parkins, Mr. H. Price, Prof. Sewell, Mr. Stansfield, M.P.; Mr. Thompson, Mr. T. Turner, Mr. T. R. Tweed, Prof. Way, Mr. Bullock Webster, Rev. C. Blair Warren, and Mr. G. Wilbraham.

Mr. Henry Waters, of Sutton, near Seaford, Sussex; Mr. James F. Burrell, jun., of Manor Farm, Frimley, near Bagshot, Surrey; and Mr. Thomas Fison, of Barningham, near Ixworth, Suffolk, were elected members of the Society.

Prize Essays.—Mr. Pusey, M.P., Chairman of the Journal Committee, reported to the Council the further adjudication of prizes by the judges of Essays. The sealed motto-papers corresponding with these Essays being opened by the chairman, the adjudications were found to stand as follows:—

1. The Prize of £50 for the best report on the Farming of the West-Riding of Yorkshire, awarded to John H. Charnock, of Wakefield, one of the surveyors under the Drainage Act.
2. The Prize of £50 for the best report on the Farming of Gloucestershire, awarded to John Bravender, Land-agent and Surveyor, of Cirencester.
3. The Prize of £50 for the best report on the Farming of Devonshire, awarded to Henry Tanner, of the Hermitage, near Newbury, Berkshire.

Lectures at York.—A letter was received from Professor Johnston, of Durham, expressing his willingness to deliver a lecture before the members of the Society, on the occasion of the ensuing York meeting in July, agreeably with the request made to him by the Council at their previous meeting.

Norwich Meeting.—The official agreement with the authorities of Norwich was received from the Corporation of that city, and ratified in the presence of the Council under the great seal of the Society, agreeably with the powers of the Charter.

Probangs and Trocars for Cattle.—Professor Sewell presented to the Society further specimens of instruments of practical utility in cases of choking, or of the hove, in cattle, and favoured the Council with additional directions connected with the use of such apparatus. He also presented, for the inspection of members, the model of an ox, on which was marked the exact spot

where, in the case of hove, the trocar ought to be inserted through the inflated hide into the rumen or paunch, namely, a full hand's-breadth below the loins, and behind the last rib, on the left side of the animal. The laterally perforated cylinder, after the stiletto had been withdrawn, might remain in its place of insertion even until the following day, if gas continued to be evolved; and, on its removal, an adhesive pitch plaster might be applied over the punctured orifice. The elastic probangs presented by Professor Sewell were very useful for unchoking horses, colts, calves, or other stock, by dislodging the impeding food from the gullet, and were much preferable to the hempen ropes often used instead of probangs for that purpose.

Shoeing Horses.—Mr. George Turner, of Barton, near Exeter, having presented at the former meeting of the Council a set of Mr. Miles's model hoofs, illustrating the mode of shoeing horses advocated in that gentleman's work on the Foot of the Horse, a copy of which Mr. Turner also presented at the same time, an interesting discussion ensued on this subject, in which Mr. Thomas Turner, Professor Sewell, Colonel Challoner, and Mr. Parkins took part. Mr. Turner stated that the system of shoeing advocated by Mr. Miles was known in the profession as the "unilateral" (or side-nailing) mode, in which the shoe was nailed to the hoof with the most decided effects in preventing the navicular disease to which the horse's hoof was so frequently liable; a system, he added, which in common justice he might be allowed to say was founded upon the important principle discovered by his brother, Mr. James Turner, V.S., of Regent-street, and published by him many years ago in his work on the Foot of the Horse, of which at the next meeting of the Council a copy should be presented for the acceptance of the Society.—Professor Sewell remarked that he had found old horses shod with a layer of leather, forming an artificial sole between the shoe and the hoof, recover from the severest affections arising from injury to the hoof, such for instance as contractions, bitterness, sand-cracks; or diseases even of the foot itself, such as thrushes, canker, and corns; and perfectly regain their original elasticity and firmness. He also strongly advised, that all horses for road or street work should be shod in that manner during the whole period of their being required for use. The plan in question had been employed by Professor Sewell for the last thirty years. The leather sole prevented that concussion from taking place against the sensitive part of the foot, which resulted in inflammation; and, by excluding all injurious substances from the hoof, those frequent accidents were avoided which arose from the falls resulting from the bruising and puncturing occasioned by such hard and sharp substances in the natural horny sole. The plan required a little practice to carry it out successfully; and it was not with an injudicious regard to economy to be abandoned when, after its adoption for some time, it might seem, from the apparent soundness and safety of the feet, that the horses no longer required it.—Colonel Challoner observed, that seventeen years ago Mr. James Turner had explained to him the principle of unilateral nailing, to which the attention of the Council was then called, and had practised it on Colonel Challoner's horses for the avowed purpose of promoting the expansion of the hoof; but Colonel Challoner had since that time been led to adopt the plan of felt-shoeing for shell-footed horses, namely, that of inserting, instead of leather, as practised by Professor Sewell, nothing more than thick felt, or thick gun-wadding, between the shoe and hoof of the horse. He had found this plan productive of the most beneficial results.—Mr. Parkins had also employed Mr. James Turner many years ago to shoe his horses on the unilateral principle.

Water-power.—Mr. Babrazon (author of a work just published on the deep sea fisheries of Ireland), having had great opportunities of experiencing in remote localities the advantage, both in economy and efficiency, of the application of water-power to the working of machinery connected with farm homesteads, had prepared a paper on that subject, which he placed at the disposal of the Council. The Council having given to Mr. Babrazon their best thanks for this mark of his attention to the objects of the Society, and referred the communication with which he favoured them to the Journal Committee, an interesting discussion ensued on the subject, in which Mr. Beale Browne, Mr. Hyett, Col. Challoner, Mr. Fuller, M.P., and the Rev. Mr. Blair Warren, detailed to the Council the results they had in their own cases respectively obtained in availing themselves of apparatus for the transfer of hydraulic power to their machinery. Mr. Browne and Mr. Warren particularly referred to the forcing pump with air chamber, made by Mr. Legg, of Cheltenham; Mr. Hyett to a Montgolfier's hydraulic ram which he had had in use, and with the most satisfactory results, for the last twenty years; Col. Challoner to the general principles of construction and economy of action in the various mechanical apparatus designed for purposes of the kind in question; and Mr. Fuller to the amount of work performed by the motive power applied to the various objects of agricultural machinery at one of his farms in Sussex.

Miscellaneous Communications. — Letter from Mr. Bates, of Kirkleavington, on the award of prizes for short-horned cattle; from the New York State Agricultural Society, on agricultural communication; from Mr. Hill Dickson, on the advantages of his flax machinery to be exhibited at the York meeting, and his request for a scrutiny into its originality, and a trial as to its peculiar merits, at that meeting of the Society; from Mr. J. W. Lloyd, on a rich marl adapted for wheat cultivation, and an inclosed analysis of its chemical constitution; Fourth Report from the Royal College of Veterinary Surgeons; two copies from Prof. Simonds, of his work just published on the Sheep-pox, illustrated with coloured plates, through Prof. Sewell, who informed the Council that he regretted to have to report that the disease in question had again broken out among sheep and lambs, and occasioned great loss to their owners; from Mr. W. B. Taunton, a copy of the Queenwood Reporter; from Mr. Fleming, a copy of his work on Agricultural Statistics; and from Messrs. Easton and Amoss, of the Grove, Southwark, a specimen of oilcake obtained by their new press at

eight times the rate of production, and with the result of more compact cakes, and a greater amount of oil.

The Council ordered thanks for these communications, and having referred Mr. Dickson's request to the Stewards of the Yard, and Mr. Lloyd's analysis of marl to Prof. Way, adjourned to Wednesday.

A Weekly Council was held at the Society's House in Hanover-square, on Wednesday, the 17th May; present: Colonel Challoner in the chair; Lord Bridport; Sir Matthew White Ridley, Bart.; Sir John V. B. Johnstone, Bart., M.P.; Mr. Almack; Mr. Berners; Mr. Brandreth; Mr. W. Burrell; Mr. Capel Cure; Mr. G. Dyer; Mr. Eggar; Mr. Fuller, M.P.; Mr. Brandreth Gibbs; Mr. Baskerville Glegg; Mr. Hyett; Rev. C. E. Keene; Mr. Kinder; Colonel MacDouall; Mr. Milward; Mr. Putland; Professor Sewell; Mr. Hampden Turner; Mr. Tweed; Professor Way; and Mr. Woolrych Whitmore.

Period of Suckling.—Mr. Wyatt Edgell, of Milton-place, Egham, Surrey, addressed to the Council, through the President, a communication on the probably injurious effects arising from the circumstance of allowing young animals to take the milk for too long a period from their dams, especially in the cases of mares and ewes, which he conceived were impoverished by such a lengthened drain upon their constitutions, while their offspring were at the same time retarded in their growth and development, from the insufficient supply and inferior quality of milk they obtained under such circumstances. Mr. Edgell was led to the consideration of this subject from a perusal of the statement made by the Rev. G. R. Gleg, in his travels in Hungary, that the high-bred foals at the great stud at Babolna usually dying at four months old, from some vicious quality as it was supposed in the milk, they were removed from the mares at the end of the first month, and fed on boiled carrots, when it was found that not one-fiftieth of the number of foals that died under the old system were lost under the new one. Without endeavouring to ascertain from what cause the milk in the case of the Hungarian mares had probably become vitiated, if a change in the quality of the milk had been the cause of the evil, Mr. Edgell thought the period of suckling the young of cattle in this country a subject worthy of consideration. This communication gave rise to an interesting discussion among the members present.—Mr. Milward thought it might be assumed as a general rule, that, under favourable conditions arising from the constitution of the mother, a requisite supply of proper food, and consequently an abundant secretion of healthy milk, the longer young animals sucked the better; and he could state from his own experience, in the case of short-horned cattle, that the calves could not acquire the full development in size or symmetry unless reared on new milk for at least the first six months after their birth.—Sir Matthew Ridley did not think it advisable to leave calves with mothers which had become again in-calf; in that case, as in the case also of all choice stock, nurse-cows would of course be provided.—Mr. Fuller, M.P., had found that those calves were always the best which had been allowed to suck the longest.—Mr. Tweed considered that foals would be injured by sucking such mares too long as were actively kept at work.—Mr. Dyer was acquainted with a large flockmaster, who constantly lost one-tenth of his 500 ewes by allowing the lambs to remain with them till July; but who, from having last year weaned the lambs considerably earlier in the season, had lost a much smaller proportion of his ewes. Mr. Dyer conceived that by the middle of May, or as soon as lambs were four months old and enabled to get their own food, when there was grass enough for them in the pastures, they might safely be weaned from the ewes; and that, on the other hand, when the ewes were low in condition, disease must necessarily be occasioned by allowing the lambs to remain too long with them.—Mr. Milward thought that the loss sustained by Mr. Dyer's friend arose from the ewes being kept in too poor a condition, and not from the circumstance of the lambs being allowed to suck them for too long a period; it all depended upon the food a flockmaster had to give them.—Sir Matthew Ridley remarked that there might be an evil in the too early weaning of lambs, as in that case the udders, from distention, unless milked by hand, would become sore and diseased. He thought that no general rule could be laid down on the subject, but that the weaning might advantageously take place when good grass was to be had by them, and in sufficient abundance, as both ewes and lambs at first destroyed the herbage to which they were put after weaning.—Mr. Glegg observed that in Scotland the Cheviot ewes had their lambs removed from them about the 20th of August.—Professor Sewell regarded the subject as one of great importance; and thought that if inquiry was instituted amongst practical farmers and breeders of sheep, much light might be thrown upon the origin of diseases still involved in obscurity, particularly in the case of young stock, which he considered to become victims to diseases too often attributed to food, soil, situation, or peculiarity of management. He had no doubt that a statistical account of the time of lambing and of weaning, and a statement of the dates at which, in different localities throughout the kingdom, grass or green crops are usually ready for ewes and lambs, would be attended with much practical benefit, as it was very likely that circumstances of situation and climate would be found to occasion much difference in the occurrence of those events; statements connected with lambing, weaning, and appearance of green food south of the Humber not applying to districts north of that division of the country.

Water Power.—Mr. Fuller, M.P., submitted to the inspection of the Council a plan of the arrangements (alluded to by him at the previous meeting), by which all the machinery of his farm at Rosehill, in Sussex, was put in effective motion by means of water power. The engineering of these arrangements was entirely due to Mr. John Miller, of Brightling, an ingenious tenant of Mr. Fuller's; and it was not only applied to the working of a large saw-mill, but also to that of a threshing-

machine, and various other purposes. The wheel was an overshot one, and constructed of iron; and the principal part of the machinery thus worked by water was the saw-mill, it being well known that in Sussex a great amount of timber was cut for a variety of national as well as private purposes; and in his case, as in that of others, employment was actually created in greater amount, but in a different direction, by this wholesale sawing up of the timber felled on his estate for that purpose; and the labourers now perfectly understood the value of the new economy under which their services were required. Mr. Fuller intends to try the cutting of Gorse to some extent by means of this machinery.

Sawdust Charcoal.—Mr. Woolrych Whitmore was led to make a few observations on the success with which he had employed charcoal obtained from sawdust, and the various refuse vegetable matter collected on his property, as a general manure for garden and field use, especially when mixed with bone, prepared according to the plan recommended by Mr. Pusey, in the proportion of one-third bone with two-thirds charcoal, employing water only as the liquid for moistening the heap, and of promoting its fermentation, and the result that was obtained in the course of a month or five weeks; and he had found no artificial manure at all equal to this fermented mixture. He found that raw sawdust did not succeed, but that charred sawdust, or sawdust charcoal, did admirably. He also ascertained that there was a mechanical advantage in sawdust, or wood charcoal, in producing this effect, not met with in charcoal obtained from couch-grass, and other charcoal from plants, the latter appearing to possess a more compact, heavy, and impervious mechanical condition, which impeded its action in promoting fermentation. This charcoal was, therefore, employed alone as a top-dressing. Mr. Whitmore had not at present devised a convenient mode of reducing his sawdust to the state of charcoal; but he had no difficulty with other substances, such as couch and other weeds, the clippings of trees, cabbage stalks, &c.; these he piled round an upright pole into conical heaps, and covered them up with earth. The pole was then gently withdrawn, and a vacancy being thus left in the heap from the bottom to the top where the pole had occupied a space, a flue was formed, which after ignition greatly facilitated the charring or slow combustion of the surrounding vegetable matter.—Professor Way remarked that the use of charcoal in agriculture was by no means carried to the extent to which, in his opinion, it ought to be. It was a substance that stood midway between a chemical and a mechanical agent, absorbing to a great amount various gases and vapours, and especially the volatile ammonia so often produced during decomposition, and allowed to escape into the atmosphere. Had he not just heard from Mr. Whitmore that charcoal and bones mixed together underwent fermentation, he should have thought that charcoal would have had the effect of retarding or even of preventing that process. As ammonia was disengaged in the decomposition of bones, the presence of a porous substance with the imbibing properties of charcoal would at once secure that volatile element and prevent its escape, rendering the artificial manure produced so much the more valuable. He had understood from Mr. Parkes that Mr. Outhwaite, a friend of his in Yorkshire, who was an excellent practical farmer, converted not only the clippings of hedges and weeds, but also all his refuse straw into charcoal, which he employed largely on his land. Charcoal had long been employed as an antiseptic, removing from decaying bodies their ill odour, as well as their tendency to putrescence; and he believed that charcoal would be found one of the best preservatives from mildew in the turnip crop, that injury being understood to arise generally from a peculiar condition of the soil.—Col. Challoner would have a small extent of one of his turnip fields immediately set apart for an experiment, and would drill in charcoal with the seed to the amount of from 10 to 20 bushs. per acre.—Professor Sewell on two successive showery days in 1846 had 25 acres of turnips sown, which yielded the most luxuriant crop; while the 100 acres sown on an adjoining farm when the dry weather had set in, proved almost an entire failure.—Mr. Whitmore expressed his intention of presenting to the Society all the details he could obtain on this subject.

Prickly Comfrey.—Mr. Brabazon presented to the Council a communication on the Prickly Comfrey, which he had grown with great success as green-feeding for horses, cows, and pigs. The Council, on the motion of Mr. Brandreth Gibbs, returned to Mr. Brabazon their best thanks for the favour of that statement, which was referred by the Council to the Journal Committee.—The reading of this account of the Prickly Comfrey, known to botanists by the name of Symphytum asperrimum, a native of the Caucasus, and as one of the mucilaginous and emollient plants belonging to the Borage family, gave rise to the communication of interesting details connected with its growth and properties.—Mr. Brandreth had grown it extensively, but he preferred Lucerne.—Mr. Brandreth Gibbs regarded the variety of Comfrey in question as the earliest springing green food with which he was acquainted; and he stated, as one of its peculiar advantages, that it grew with the greatest readiness wherever planted, whether on banks or other waste pieces of land, or among brick rubbish used for filling up hollows: its tenacity, however, when once planted, was such as to render its eradication as difficult as that of the Common Dock or Horse-radish.—Mr. Greaves, of Matlock Bath, Derbyshire, had also grown it largely from seed transmitted to him by Messrs. Thomas Gibbs and Co., the Seedsman to the Society, and he had found it yield most abundant crops of green food.

Lectures.—Prof. Simonds, Lecturer on Cattle Pathology in the Royal Veterinary College, conveyed to the Council his thanks for the honour they had done him in selecting him to deliver one of the Lectures to the Members of the Society on the occasion of their ensuing York Meeting, and the satisfaction it would give him to promote in that, or any other manner, the useful objects of the Society.

Lodgings.—Mr. Foster, Secretary to the Local Committee at York, informed the Council that he had opened

a Registry of Lodgings, at his office in that city (22, Ogleforth), for the convenience of Members of the Society, and other visitors who may attend the ensuing Country Meeting of the Society, in the week commencing Monday, the 10th of July next.

Mr. Fisher, of Blandford (and 23, Cockspur-street, Charing-cross), presented to the Society a proof impression of the engraved Portrait of Lord Portman, after the painting of Fancourt by Holl; the Royal Academy of Sciences at Munich transmitted copies of their transactions; and Prof. Sewell, the natural hoof of a horse, on which was nailed a shoe with leather interposed, agreeably with the plan stated by him at the previous Meeting.

The Council then adjourned (over the 24th) to the 31st of May.

A Special Council was held on Friday, the 19th of May: present, the Right Hon. Lord Portman, in the Chair; Sir M. W. Ridley, Bart.; Sir Charles Lemon, Bart., M.P.; Sir John V. B. Johnstone, Bart., M.P.; Mr. Raymond Barker; Mr. Burke; Col. Challoner; Mr. Bell Crompton, and Professor Sewell. The report to be made by the Council to the ensuing General Meeting was taken into consideration and agreed to unanimously.

GENERAL MEETING.

The May General Meeting of the Society was held this day, at the Society's House in Hanover Square. The Earl of Yarborough, President, in the Chair, supported by the Duke of Richmond, Earl of Egmont, Earl of Lovelace, Lord Portman, Lord Bridport, &c., &c.

The Secretary, by direction of the President, read the following Report from the Council.

REPORT.

The Council report to the Members at their present General Meeting that during the half-year—

139 new Members have been elected
31 have died
82 have been struck off, and the Society now consists of—
93 Life Governors
186 Governors
648 Life Members
5387 Members
21 Honorary Members.

Total 6335

Mr. Hudson, M.P., has been elected to supply the vacancy in their body occasioned by the decease of Mr. Browne.

The Council have to express their regret that Mr. Parkes, in consequence of his other professional engagements, has found it necessary to resign the office of Consulting Engineer; but they have the pleasure of stating that, as an Honorary Member of the Society, he has signified his readiness to assist the Council with his skill and experience.

In order to render their Meetings more convenient to all parties, the Council have altered that part of the Bye-laws which prescribes Wednesday as the day of Meeting; and have decided that, after the expiration of the current month, the Monthly and Weekly Meetings of the Council shall be held on Tuesday instead of Wednesday, the hour of meeting remaining at 12 o'clock as heretofore.

The Council have decided that, agreeably with the privilege conferred by the recent Treasury order, regulating the transmission of books through the Post Office, the Journal of the Society shall be issued by post on the day of publication, to each Member of the Society whose subscription is not in arrear.

The Council have, after due investigation, determined to adopt at the approaching Country Meeting a simple and improved method of testing the comparative efficiency of the implements to be selected for trial on that occasion; and they have decided that in addition to the Consulting Engineer of the Society, who will act as the mechanical referee, there shall be ten judges of implements, two of these being engineers, and the remaining eight practical farmers. That the two engineers shall be the sole judges of steam engines and of steam power generally, considered in a scientific and mechanical point of view, without reference to the application of such power to agricultural machinery; but that they shall report to the Stewards in writing, for the information of the other judges, a statement of the power applied to the machinery under the consideration of any such judges. Also, that the other judges shall judge the work done by any agricultural machine to which steam or other power is applied; but that it shall be an instruction to them to pay every attention to the Report of the engineers in forming their judgment of the work of the machinery on which they are called upon to adjudicate.

The Council are in communication with the Directors of the various Railway Companies throughout the kingdom, respecting the transit of live stock and implements to and from the place of exhibition: and they hope, through the liberal co-operation of those Railway Companies, to make such arrangements as will be satisfactory to all parties.

In compliance with the strong local feeling expressed to the Council, they have decided to hold a Council Dinner at York.

Professor Johnston, of Durham, and Professor Simonds, Lecturer on Cattle Pathology in the Royal Veterinary College, have each consented to deliver a lecture before the members of the Society, on consecutive evenings, during the period of the York Meeting: the former, on the application of science to agriculture; and the latter, on the anatomy, physiology, functions, and diseases of domesticated animals.

The Council have decided to afford the public admission into the Cattle Yard, under certain regulations and conditions, on the Wednesday evening, after all the Judges have delivered in their awards.

They have the satisfaction of stating that the number of agricultural implements entered for the York Meeting exceeds that of any former year; and the entries of live stock for that exhibition are very numerous. They have every reason to hope, from the favourable

circumstances under which the York Meeting will be held, that the ensuing Country Meeting in that city will be inferior to none that have preceded it.

They have accepted the invitation of the authorities of Norwich to hold the Country Meeting for the Eastern District of England, in 1849, in that city; and in conformity with the practice of the Council, they have decided that the district for the Country Meeting in 1852 shall be comprised of the whole of South-Wales, with the addition of the counties of Monmouth, Gloucester, Hereford, and Worcester; the districts for the meetings to be held in the intermediate years having been already decided, namely, the South-Western District for 1850, and the South-Eastern for 1851.

The Council, in conclusion, have the satisfaction of reporting the successful progress of the Society in the gradual development of its power of promoting the extension of knowledge in reference both to the science and practice of agriculture: and supported as the Society so cordially has been, and continues to be, throughout the kingdom, the Council cannot entertain a doubt of the continuance of its prosperity and usefulness.

By order of the Council,

JAMES HUDSON, Sec.

This Report was unanimously adopted.

Mr. Raymond Barker, Chairman of the Finance Committee, read to the Meeting the half-yearly Report from the Auditors of the Society's accounts on the part of the Society, of which the following is a summary:—

RECEIPTS.

	£	s.	d.
Balance in hand 1st July 1847	1,925	12	4
Dividends in £8,999 Stock	141	19	4
Compositions for life	325	10	0
Annual subscriptions	2,370	2	0
Sale of Journal	153	16	0
Country meetings	143	5	8
Cottage tracts and council badges	12	13	7
	£5,072	18	11

PAYMENTS.

	£	s.	d.
Permanent charges	278	12	6
Taxes and rates	17	1	2
Establishment	447	10	9
Postage, carriage, &c.	44	9	6
Expenses of Journal	652	12	0
Prizes	1,347	15	6
Marquis of Downshire's addition to flax prize	30	0	0
Country meetings	1,005	8	0
Analyses of ashes of plants	100	0	0
Subscriptions allowed	2	0	0
Miscellaneous payments	5	15	0
Balance in hand, 31st Dec., 1847	1,141	14	6
	£5,072	18	11

(Signed) C. H. TURNER. } Auditors on the part of the
THOS. KNIGHT. } Society.
THOS. RAYMOND BARKER. } On the part of the
C. B. CHALLONER. } Finance Committee.

The following elections for the ensuing year were made unanimously:

President: The Earl of Chichester.

Trustees: Sir Thomas Dyke Acland, Bart., M.P.; Lord Braybrooke; Hon. Robert Henry Clive, M.P.; Right Hon. Sir James Graham, Bart., M.P.; Sir Francis Lawley, Bart.; Joseph Neeld, M.P.; Lord Portman; Philip Pusey, M.P.; Duke of Richmond; Duke of Rutland; Earl Spencer; Duke of Sutherland.

Vice-Presidents: Earl of Chichester, Marquis of Downshire, Earl of Ducie, Earl of Egmont, Marquis of Exeter, Earl Fitzwilliam, Sir Thomas Sherlock Gooch, Bart., Earl of Hardwicke, Viscount Hill, Earl Talbot, Duke of Wellington, Earl of Yarborough.

Council—(25 members of)—Thomas Raymond Barker; John French Burke; Samuel Druce; Richard Garrett; B. T. Brandreth Gibbs, Lodge, Old Brompton; Stephen Grantham; the Lord Hatherton, Teddesley Hall, Staffordshire; C. Hillyard; William Fisher Hobbs; George Hudson, M.P.; Samuel Jonas; John Kinder; John Bennet Lawes, Rothampsted Park, Hertfordshire; Earl of Leicester, Holkham, Norfolk; Sir Charles Lemon, Bart., M.P.; Hon. Captain Dudley Pelham, R.N., St. Lawrence, Isle of Wight; Professor Sewell; William Shaw (London); William Shaw (Northampton); Robert Aglionby Slaney, M.P.; Robert Smith; Charles Stokes; Henry Stephen Thompson; Thomas Umbers; Jonas Webb, Babraham, Cambridgeshire.

NEW MEMBERS.

Cross, John, Manor Farm, Wentworth, Ely, Cambridgeshire
Greenwood, Edwin, Swarcliffe, Harrogate, Yorkshire
Mayes, Charles, Hoveton, Coltishall, Norwich
Ramsbottom, John, Bilham Grange, Doncaster
Read, Clare Sewell, Kilpaison, Pembroke
Waters, Edward, Arminghall, Norwich
White, William, Secretary of the York Farmers' Club
Worthington, George, jun., Liverpool.

THE CONDITION OF FARM LABOURERS.—The Aveley Farmers' Club met on Thursday, to discuss "what steps can and ought to be taken to improve the moral and social condition of the agricultural labourer?" The question was introduced by a member, who first drew a sketch of the present condition of the farming labourer as contrasted with other classes of society; his exposure to temptation when unable to obtain employment; and the melancholy state to which he was reduced when, through want of this means of providing for himself and family, no alternative was left him but that of gaining a living by dishonesty, or of entering the union house. There were, he continued, three objects which he considered especially calculated to claim the attention of the meeting, and of all those persons who, from their circumstances or position, possessed the power of promoting them. The first of these was the important benefit which would accrue to the labouring man, if those farmers whose capital enabled them to enlarge their business would, instead of extending their occupation, employ it in additional labour; for by this means they would materially reduce the poor-rates, increase their profits, and add to the general production of the country; for it by no means followed as a matter of course, that an increase in the number of acres comprehended an increase of business, since daily experience would show that there is frequently as much labour employed on some farms of two hundred acres as on others of double that number. Another means whereby the condition of the labourer might be exceedingly improved would be the providing for him a comfortable cottage, with a garden attached to it. "On this subject," said he, "I can speak mos

feelingly and from experience, having been in the habit of visiting as many as seventy cottages in a day; and I am convinced that nothing is more calculated to demoralise the labouring classes, and render them unhealthy and unhappy, than the present crowded and miserable condition in which whole families are frequently huddled together in one or two small, badly-ventilated, and ill-lighted rooms, without regard to either age or sex. The poor man is thus driven to seek at the beer-shop that comfort or relief which he cannot find at home; he is there exposed to the example of men of bad character, loses his self-respect, becomes reckless of himself and indifferent to the welfare of his family, and thus sinks below the moral standard which, under more favourable circumstances, he would have sustained." The third object to which the attention of the meeting should be directed was one the importance of which was now so universally acknowledged that it needed only to be casually alluded to. It was that of extending more liberally to the poor man the benefits of education. After many of the members had expressed their concurrence in the foregoing remarks, the meeting was addressed by a visitor, a native of Scotland, who expatiated on the importance of educating the agricultural labourer, and after referring to his own country as a fair example of its good effects, expressed his conviction that in the county of Aberdeen scarcely one poor man could be found who was unable to read or write. The following resolution was then passed:—That this club deeply feels the necessity of improving the moral and social condition of the agricultural labourer, and strenuously urges on landlords the duty of co-operating with their tenants, in 1. Providing comfortable cottages and gardens. 2. Enlarging the field of labour. 3. Extending the blessings of education.

LIABILITY OF OWNER FOR TRESPASSES OF SHEEP AND OTHER ANIMALS.

At the County Court, held at Conway, Carnarvonshire, before A. J. Johnes, Esq., an adjourned judgment was delivered by his Honour, which will be read with much interest in the Principality of Wales. The litigant parties were *Wm. Owen* v. *Thomas Pierce and Richard Jones*.

His Honor's judgment, in which the principal facts were recapitulated, was to the following effect:—

In this case, the facts material to be determined were admitted, and a mere question of law remained. It appears that the Plaintiff and Defendants were jointly liable to maintain a fence adequate to keep cattle from straying, but not adequate to restrain the mountain sheep of Wales. The Plaintiff continually suffered from the depredations of the Defendants' sheep, and the question was—On whom was the loss caused by such depredations to fall?

For the Defendants, it was contended that the Plaintiff was bound to protect himself by proper fences, and therefore must bear the loss. I cannot assent to this agreement; for it has been conceded that the fence which the Plaintiff was bound to maintain was not one at all calculated to keep sheep within bounds.

It has indeed been urged that a liability to maintain a fence adequate for one purpose involves a liability to keep a fence adequate for all purposes. But there is a proposition for which I can find an authority, and I consider it to be clearly at variance with reason and justice.

The leading principle which must guide us in cases of this nature is the rule which undoubtedly prevails at Common Law, that the owner of animals is liable for any damages or trespasses they may commit. This liability exists between the occupiers of land not at all separated by fences (Viner's Abridgment Titles, "Fences and Trespasses," Blackstone, by Sweet and Welsby, 3 vols).

Now it is undoubtedly true that, where the Plaintiff is liable to keep a fence, it will deprive him of his right of action for the trespasses of such animals as would have been restrained by a fence of that particular description which he is bound to maintain. But, as regards animals of a different kind not so easily restrained, and against which the prescriptive fence would not prove a protection, I consider that the owner of these animals is liable, under the primary Common Law Rule, for the injury they may inflict. Any exception to that Rule must be clearly established.

All the cases which have been cited on behalf of the Defendants appear to me to be decidedly in favour of the Plaintiff. The result of the cases, collected in 9 vols. Peterstoff (title, "Fences"), is as follows, viz.: that where neither party is bound to repair a fence, each "must take care that his beasts do not trespass on his neighbour."

Dovaston v. *Payne*.—2 Henry Blackstone, p. 527, establishes, that when cattle stray from the high-road, on land not properly fenced—the want of fences will be no answer to an action of trespass by the occupier of such land, unless the animals were on a journey—if they are allowed to stray on the road by the negligence of their owner, he is liable to an action, even by an occupier of land not properly fenced.

This case is a very strong one in favour of the Plaintiff.

Robins v. *Jones* (15, Law Journal), is also a strong case in favour of the Plaintiff; as it establishes that the right termed "Common of Vicinage," which was set up for the Defendants, cannot exist except in the case of adjoining commons, and does not apply to enclosed lands, the question raised in the present instance.

It has been urged that it is a matter in which I have no jurisdiction, as a disputed question of Title or Prescription is involved. But there is no dispute as to the nature of the Title or of the Prescription referred to in the arguments. All the facts are admitted, and the only question left for me to decide is the mere question of Law, whether a liability to fence against animals of one description is an answer to an action founded on the trespasses of animals of a different description, against which such fences would have been found insufficient. This is not a question of disputed Title, or of disputed Prescription, but a mere question of Law, arising on facts mutually admitted, on which I possess, as I conceive, undoubted jurisdiction. Nor is this (as has been urged) a question between the land-owners; for it has been expressly decided that the occupier only is liable for not properly fencing (Viner's Abridgment); and for the damages done by animals their owner, not his landlord, is obviously responsible.

It appears to me clear that the Common Law Rule, rendering the owner answerable for the trespasses of his animals, is required by the public good. Any undue relaxations of that Rule would tend greatly to retard the progress of cultivation. Mutual forbearance between the occupiers of adjoining lands is commendable, and often very desirable for their common interests. But great injustice would arise, if such forbearance were to be viewed as the foundation of a right. In this instance, for example, the Plaintiff, who kept but few sheep, could not have had any compensation or equivalent for the depredations to which he was so long exposed from those of the Defendant.

EXMINSTER FARMERS' CLUB.

The Exminster Farmers' Club held their first meeting for the year at Hazell's Devon Arms, Kenton, on Monday, March 20th, when Dr. Bucknill gave the first of a series of six lectures on Agricultural Chemistry, illustrated by experiments: the lecture was on Chemical Agents—Oxygen, Hydrogen, Nitrogen, Phosphorous, and Carbon; and the lecturer was particularly happy in his illustrations, and in conveying his information in very plain and intelligible terms. There was afterwards a very useful discussion on the best method of sowing and manner of cultivating carrots and mangold-wurtzel.

On Monday, April 17th, the second meeting took place, and Dr. Bucknill favoured the club with his second lecture on Chemical Combinations, which were beautifully shewn, especially the composition and decomposition of water; the formation of the sulphuret of iron; the formation of that curious and extraordinary metal from alkali, called potassium, specimens of which were exhibited, and its rapid attraction of oxygen shewn by throwing it into water, when it instantly blazed up. The atomic theory was ably shewn, and according to Newton and Dalton, the invisible, eternal, and unalterable nature of each atom proved. Light, heat, and electricity were shown to be immaterial and imponderable, and the vesicular theory of water in the clouds was observed on. Matter formed of solids, liquids, and gases, and its continuations, was shewn, and the *fixed* proportion in which they always combine. The nature of chemical affinity was explained. The necessity for understanding elementary instruction in agricultural chemistry was especially recommended to farmers' sons.

S. T. Kekewich, Esq., and Mr. Frederick Elliott moved and seconded a vote of thanks to the worthy Dr., which was unanimously adopted.

Thomas Newman, Esq., then introduced the subject for discussion, "*The advantage* of raising *the greatest possible* quantity of *green food*, as a *means* of producing *more* animal food, and thereby diminishing the cost price of grain."

Mr. Newman thought agricultural chemistry had made but little progress as yet among practical farmers, but had established certain leading points. He thought the present system of farming was deteriorating the lands, and that consequently farm profits must lessen, unless a better system was introduced, which he showed to be in the farmer's power, by greatly increasing his growth of vegetable matter in every sort of green crop, and, in addition, feeding stock with oil-cake; the nitrogen thus produced in nature's manufactory, the digestive organs of cattle, would bring back in manure all the fertilizing qualities that previous crops had taken from the land; and to such an extent might this be done, that after some years the soil would be so benefited as to require but very little manure. He would suppose that on the four-course system of cultivation, with an outlay of £4 per acre, the following may be considered an average production:—

Wheat, 22 bushels per acre, 6s.	£6	12	0
12 tons turnips, 8s.	4	16	0
22 bushels wheat, 6s.	6	12	0
7 seams clover, 10s.	3	16	0
	£21	10	0

being a gross average produce of £5 7s. per acre. By an outlay of £7 per acre the produce would be on the same course of cultivation increased to—

30 bushels wheat, 6s.	£9	0	0
20 tons turnips, 8s.	8	0	0
40 bushels barley, 4s.	8	0	0
12 seams clover, 10s.	6	0	0
	£31	0	0

being a gross average produce of £7 15s. per acre, and £2 8s. per acre in favour of the higher system of cultivation, besides the latter producing just double the weight of straw, and shewing that the cost price of producing an acre of wheat at £4 would be 3s. 8d. per bushel, whereas the cost of wheat on which an additional outlay had been made would only be 3s. 6d. per bushel. He thought it impossible to grow too much green food, and recommended vetches very highly manured, followed by turnips, both eaten off by sheep, fed also at the same time with oil-cake. A friend of his, Mr. Gwell, had in this way grown 68 bushels per acre of wheat. He showed the difference in two adjoining fields on the Mamhead farm, one where the sheep had oil-cake with the turnips, the other without: the produce where the cake was used, although the land was much inferior in quality to the other, was 36 bushels of wheat per acre, and on the other 26 bushels per acre. He thought the climate of Devon and Cornwall more favourable to vegetation than Norfolk, Suffolk, or Lincolnshire, and from our having the autumnal rains, which they have not, the climate of the Lothians is similar to ours, where they grow 40 bushels wheat, 60 bushels barley, 80 bushels oats, after vegetable feeding. He strongly advised farmers' sons not to separate from their parents in farming, but keep all their capital together, to carry out a better system, a large capital being thus so much more productive than a divided one; thought that partnerships in farming would be as beneficial as in trade and commerce; but assured them of the necessity of changing their present system, and growing more green food to feed cattle, to enable them to compete with the foreigner and increase their profits.

A long discussion now took place, in which the members generally joined, and explanations on many points

having been given by Mr. Newman, the following resolution was agreed to unanimously :—

"That this meeting is of opinion that the system of growing a greater amount of green crop as a means of producing more animal food, as suggested by Mr. Newman, is the best plan by which a sufficient quantity of corn can be grown to enable the English farmer to cultivate his farm with advantage to himself and also to the community."

THE CORN AVERAGES.

TO HIS GRACE THE DUKE OF RICHMOND.

My Lord Duke.—Allow me the honour to address your Grace on the subject of "corn averages." Your Grace is reported to observe in the House of Lords, on Friday night last—"That it was of immense importance that the average of corn should be literally true as to the quantity of corn sold and the prices which it fetched; for upon these averages depend the payment of tithe under the Commutation Act." Perhaps your Grace will allow me to add that it is of immense importance, also, "that there should be established some more effective supervision of corn returns in this country," for the purpose of regulating the market prices. For illustration, take the city of Salisbury. The inspector's returns no doubt are correct, by the rule of "alligation medial," and in conformity to the instructions of the Board of Trade; but, my Lord Duke, the inspector's return is not published till one week after the market takes place! and, consequently, of no service whatever. I, therefore, first humbly submit to your Grace that the return should be published as soon as possible after the market is over, for the information of the country (through the press), and for the guidance of farmers and dealers who are immediately proceeding to other markets. Were the returns, however, to be thus forthwith published as suggested now by me, the information then would rarely be of any value, as the method employed for the purpose of the Tithe Commutation Act is not calculated for the purpose of regulating the market prices. Suppose the quantity of wheat sold be very limited, which is frequently the case (holders being firm and purchasers tenacious), that the quality sold was very inferior—that the last quotations were from 44s. to 54s., and that the following is an extract from the inspector's return:—

"Wheat, 105 qrs., realized £235 10s., at £2 4s. 1¼d. per qr.," which may be 60 qrs. at £2 4s., and 45 qrs. at £2 6s. per qr.

Now, my Lord Duke, in this case the public would conclude that wheat was considerably cheaper, when, in point of fact, the reverse may be the case (the farmers would not part with their good samples, and the inferior was disposed of because a better quality was too dear). On the other hand, the following week, supply being imperatively required, the millers and bakers are obliged to purchase for the week's consumption; that no very inferior samples are offered, and that the following is an extract from the inspector's return:

"Wheat, 700 qrs., realized £1,870, at £2 13s. 5d. per qr." which may be 600 qrs. at £2 14s., and 100 qrs. at £2 10s. per qr.

In these examples, your Grace will be pleased to observe that the prices remained stationary from 44s. to 54s., both weeks, while the inspector's corn average, so much depended on, varied 9s. 3¾d. per qr. (excluding fractions). The last week it would be reported that wheat rallied in price at the Salisbury market more than 9s. per qr., on an average, by the inspector's return (and, therefore, it must be true); and, consequently, the prices at Devizes and Warminster markets rise in proportion. The farmers, of course, are delighted, and the poor fear the consequences, while the cause is kept a secret by Mr. Corn-inspector, who has no right or authority to explain the reason. Now, my Lord Duke, I presume it would be greatly to the interest both of the buyer and seller of wheat, and all other grain, were the inspectors to return the total number of quarters sold at every price, as well as the average per qr., as follows:—

	Qrs.		£	s.	d.
Wheat	100	at	2	4	0
Ditto	100		2	5	6
Ditto	87		2	10	0
Ditto	81		2	12	0
Ditto	100		2	13	0
Total quarters sold	468	Realised	£1,140	12s	
Average per qr.	£2	6s.	8¾d.		

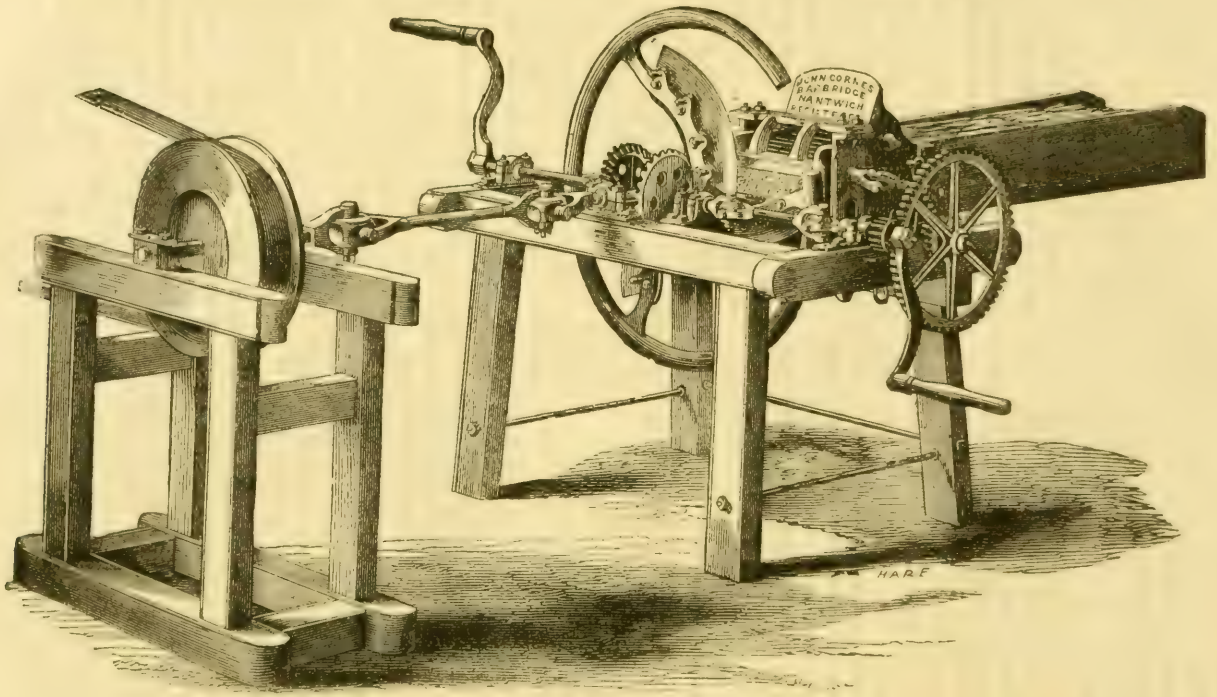
Allow me also to suggest, that both buyers and sellers should be compelled to return the quantity bought and sold by them, which would serve as a preventive against false statements. The additional duty imposed on the corn inspectors would be very trifling—merely a few more figures to insert in their returns, while the public would be furnished with true information. The newspaper reports are now continually at variance on this important subject, because reporters are imposed on by interested parties, or have not the opportunity of obtaining full particulars. Resting assured that the importance of this subject will plead excuse for my taking the liberty to thus address your Grace, and that you will call the attention of the authorities to the remedy pointed out by me,

I have the honour to be, my Lord Duke,
Your Grace's most obedient servant,
James Goodfellow.

Author of the "Ready Reckoner, showing the Value of Lands per Acre, under every possible Contingency."

Fisherton, Salisbury, Wilts.
April 19, 1848.

CORNES'S IMPROVED CHAFF-CUTTING MACHINE.



The above engraving of Cornes's Chaff-Cutting Machine represents it as adapted for either hand or horse-power. It has been honoured with a prize of £10 from the Royal Agricultural Society of England in three successive years, 1845, 6, and 7; and has been most favourably spoken of by those who have tested its qualities in their own service. It is fitted with three knives; the cut is 12 inches wide and $2\frac{3}{4}$ inches thick, and makes five different lengths of chaff, suitable for horses, cattle, and litter. It is also fitted with feeding rollers, between which the material passes to the front ones; these are to protect the hands of the man or boy in attendance from being drawn into the machine by entanglement in the hay or straw. The numerous imitations of this engine are perhaps the highest testimony to its intrinsic value.

REPORT OF THE AMERICAN COMMISSIONER OF PATENTS.

The following facts, which we extract from the printed report of the American commissioner, have, we think, sufficient scientific interest to justify their insertion, exhibiting another instance of the public and economic advantages which are only possible by the union of science, enterprise, and capital:—

"Cincinnati, being the centre of an immense corn-growing and hog-raising region, is, in fact, the principal pork market in the United States, and, without even the exception of Cork or Belfast, the largest in the world.

"The business of putting up pork here for distant markets is of some twenty-six years' standing; but it is only since 1833 that it has sprung into such importance.

"From the year 1833, when 85,000 hogs were slaughtered, the business has gradually increased, until in 1847 it amounted to 250,000 hogs.

"From the 8th to the 10th of November the pork season begins, and the hogs are sold by the farmers direct to the packers. When the quantity they own justifies it, some of these farmers drive, in one season, as high as one thousand head of hogs into their fields. From one hundred to three hundred are the common numbers, however.

"250,000 head of hogs yield:—

Of pork	150,000 lbs.
bacon.....	21,000,000
lard	13,800,000

"These are the products thus far of the pork-house operators alone.

"The lard made in Cincinnati is exported in packages for the Havanna market. It is shipped to the Atlantic market also, for local use, as for export to England and France, either in the shape of leaves or in the lard oil, large quantities of which are manufactured in the east.

"There is one establishment here which, besides putting up hams, &c., is extensively engaged in extracting the grease from the rest of the hog. This, during the present year, will probably operate on 30,000 hogs. It has seven large circular tanks, six of capacity to hold each 15,000lbs.; and one to hold 6,000 lbs. These receive the entire carcass with the exception of the hams, and the mass is subjected to steam process under a pressure of 70lbs. to the square inch, the effect of which operation is to reduce the whole to one consistence and every bone to powder. The fat is drawn off by cocks, and the residuum, a mere earthy substance, is taken away for manure. Besides the hogs which reach this factory in entire carcasses, the great mass of heads, ribs, and backbones, tail-pieces, feet, and the trimmings of the hogs cut up at different pork-houses, are subjected to the same process, in order to extract every particle of grease. This concern alone will turn out this season 3,600,000 lbs. of lard, five-eighths of which is No. 1. Nothing can surpass the purity and beauty of this lard, which is refined, as well as made, under steam process. Six hundred hogs per day pass through these tanks, one day with another.

"I come now to the manufacture of lard oil, which is accomplished by divesting the lard of one of its constituent parts—stearine. There are, probably, thirty lard oil factories here, on a scale of more or less importance. The largest of these, whose operations are probably more extensive than any other in the United States, has manufactured heretofore into lard oil and stearine 140,000lbs. monthly, all the year round. The great increase of hogs for the present season will probably enlarge that business this year fifty per cent.

"11,000,000 lbs. of lard will be run into lard oil this year, two-sevenths of which will make stearine, the residue lard oil; or, in other words, 24,000 barrels of lard oil, of 41 to 42 gallons each. The oil is exported to the Atlantic cities and foreign countries. Much the largest part of it is inferior lard, made of marsh-fed and still-fed hogs, and the material, to a great extent, comes from a distance, making no part of these tables. Lard oil, besides being sold for what it actually is, enters largely into the eastern states into the adulteration of sperm oil, and in France serves to reduce the cost of olive oil. The skill of the French chemists enables them to incorporate from 65 to 70 per cent. of lard oil with that of olive. The presence of lard oil can be detected, however, by a deposit of stearine, small portions of which always remain with that article, and will be found at the bottom of the bottle.

"I now come to the stearine candles made of the stearine expressed from the lard in the manufacture of lard oil. The stearine is subjected to hydraulic pressure, by which three-eighths of it is discharged as an impure oleine. This last is employed in the manufacture of soap; 3,000,000 lbs. stearine, at least, have been made in one year into stearine candles and soap in these factories, and they are prepared to manufacture 6,000 lbs. of candles per average day throughout the whole year. The ma-

nufacture of this year will probably approach that amount, as the present supply promises the raw material in abundance.

"From the slaughter, the offal capable of producing grease goes to another description of grease extractors, where are also taken hogs dying of disease or by accident, and meat that is spoiling through unfavourable weather or want of care. The grease made here goes into the soap manufacture. Lard is computed to form 80 per cent. of all the fat used in the making of soap. Of the ordinary soap 100,000 lbs. are made weekly, equal, at four cents per pound, to 200,000 dollars per annum. This is exclusive of fine soap and of soft soap, which are probably worth 25 per cent. more.

"Glue to an inconsiderable amount is made of the hoofs of hogs.

"At the rear of these operations comes bristle-dressing for the Atlantic markets. This business employs 100 hands, and affords a product worth 50,000 dollars.

"Last of all comes the disposition of what cannot be used for other purposes—the hard hoofs and other offal. These are employed in the manufacture of prussiate of potash, to the product of which also contribute cracklings or residuum left in expressing the lard. The prussiate of potash is used extensively in the print factories of New England for colouring purposes. The blood of the hogs is manufactured into prussian blue.

"Few persons in the east can realize the size and fulness to which hogs grow in the western states.

"The following are specimens of hogs and lots of hogs killed in Cincinnati during this and the preceding season :—

7	hogs	.....	averaging	720	lbs. each.
5	"	.....	"	640	"
22	"	.....	"	403	"
52	"	.....	"	377	"
50	"	.....	"	375	"

"There are, perhaps, 1,500 coopers engaged in and outside of the city making lard kegs, pork barrels, and bacon hogsheads; the city coopers, when they are not needed in stack barrels and other cooperage; and the country coopers, whose main occupation is farming, during a season when the farmers require no labour at their hands. Vast quantities of boxes of various descriptions are made for packing bacon for the Havanna and European markets.

"The slaughtering, waggoning, the pork house labour, the rendering grease and lard oil, the stearine and soap factories, bristle-dressing, and kindred employments, supply abundant occupation to men, who in the spring are engaged in the manufacture and hauling of bricks, quarrying and hauling stone, cellar digging and walling, bricklaying, plastering, and street-paving, with other employments, which in their nature cease on the approach of winter, and thus supplies labour to the industry of probably 6,000 individuals, who, but for its existence, would be earning little or nothing one-third of the year.

"The United States' census for 1840 gives 26,301,293 as the existing number of hogs at that date. The principal increase since is in the west, owing to the abundance of corn, so that the whole number of hogs in the United States may now be safely estimated at 45,000,000. This is about the entire number assigned to Europe in M'Culloch's 'Commercial Dictionary,' and there has probably been no material increase there since, judging from the increasing want of the population in that quarter.

"The number of hogs cut up in the valley of the Mississipi will reach this year to 1,500,000; of this 28 per cent., or more than one quarter, is put up for market in Cincinnati."

STORRINGTON FARMERS' CLUB.—A meeting was held at the White Horse, on Thursday, the 13th May, for the purpose of considering the propriety of forming a farmers' club for that neighbourhood. The meeting was attended by several influential farmers from the immediate neighbourhood, amongst whom were—Messrs. Edward F. Upperton, Thakeham; Richard Emery, Hurston; William Stanford, Parham; William Battcock, Storrington; William Bird, Sutton; Robert Chatfield, Greatham; William Golds, Findon; Alfred Michell, Kithurst; Henry Hardwich, Sullington; W. Botting, Thakeham; Edward T. Upperton, Burpham; G. Lear, Storrington. Mr. Edward F. Upperton was unanimously called to the chair. After an interesting discussion upon the propriety of forming a farmers' club, the Chairman put the question for the establishment of the "Storrington Farmers' Club" to the vote, when the resolution was unanimously carried. The Chairman congratulated the meeting on the unanimous decision at which they had arrived. He was decidedly favourable to the establishment of the society, believing that the intercourse and exchange of ideas arising out of such associations were calculated to lead to much practical advantage. If farmers always remained at home, satisfied with their own plans and with their own systems, they naturally got conceited (laughter) and were impressed with the opinion that those plans and systems were the best that could be followed; whereas if they belonged to an association like that which it was the aim of the present meeting to establish, they interchanged ideas and communicated to each other those facts which the experience of each supplied. Thus most valuable information was often acquired. After some further remarks pointing

out the advantages to be derived from coming in contact with intelligent practical agriculturists, the chairman suggested, that having decided on the establishment of the society, the next step would be to consider its constitution, and to frame a code of rules and regulations for its governance. Mr. Botting laid before the meeting the rules of the "Dorking Farmers' Club," many of which were adopted, and others added. A committee was appointed to carry out the object in view, and another meeting will be held to complete this desirable work.

CATTLE INSURANCE.

The tendency of all modern improvements in agriculture is towards that approximation to certainty which has been attained in nearly all other occupations. By drainage and better culture we shall alone improve the soil, and correct the climate of this country, render the farmer, to an extent formerly thought impossible, independent of seasons, and reduce the business of husbandry to one of skill and calculation. The occasional prevalence of incendiary fires in the rural districts, for many years past, has rendered the practice of insuring farming stock and crops against fire practically universal: no farmer, who expects to prosper, permits his live and dead stock to remain uninsured against fire. Companies too have been established to insure growing crops against hail-storms, and similar visitations, which sometimes, and in some places, have, on the eve of harvest, converted the prospect of plenty and comfort into wide-spread misery and desolation. The principle of life insurance, moreover, by which the farmer, as well as other men of business, can secure to his family some pecuniary alleviation, if not a compensation for the loss of his own exertions, has been applied to live farming stock; and for very many reasons the practice of protecting live stock against loss by disease or accident merits the attention of every farmer. Its adoption, partial as it may be at present, affords evidence of the gradual approach made by husbandry towards some economical and commercial principles. It marks the transition from empiricism in farming towards practical science applied to agriculture.

One of the most obvious benefits to be derived from such associations will be the gradual formation of accurate calculations of the expectation of life and disease amongst our live stock. Experience will ascertain in what districts disease and the peculiar forms of disease are most prevalent, and the causes will be investigated. If farmers in one district, or adopting one system, can only insure their life stock at a premium of 4 or 5 per cent., while others in another district, or under a different plan, can effect the same provident object at 2½ or 3 per cent., the why and the wherefore of the higher rates of premium will inevitably lead to an examination of local causes of disease, and the disuse of plans of management so practically shown to be unwise. In both cases, improvement and increased certainty in estimating the result of a given outlay of capital in farming, will be the consequence. They will also tend strongly to improve the management of individual farmers, as the rules and regulations forbid any proposal of a doubtful character to be taken by an agent, so that a farmer notorious for want of care with his stock, would be at once rejected; and independently of the direct losses from bad management, the negligent stockmaster would find himself out of the pale of insurance against accidental or epidemical contingencies. Here there is at once a premium upon prudence and a business-like character, the value of which is fully understood in all trades, except that of husbandry. It is also requisite that the farm buildings of all parties insured should be kept clean, drained, and properly ventilated; the cattle and horses well tended and fed, and due care given to their general health and well-being; neglect of any kind, either in the owner or his servants, resulting in loss, vitiating his claim upon the company.

The general practice of cattle insurance also makes the farmer more independent. By a comparatively small outlay he secures himself against those contingencies of destruction amongst his cattle which are frequently so ruinous to his prospects. He is secure from the humiliation, in case of loss, of going before his landlord, with "bated breath," craving his honour's indulgence, or remission of rent, as is so frequently done; and, at the same time, the pocket of the landlord is spared, and his rent more fully secured. Such may be said to be the general effect of the operations of cattle insurance. It is an incalculable benefit to the landlord and to the tenant, and as such should meet with liberal encouragement from both. So highly, indeed, is the principle already appreciated by many large landed proprietors, that they pay half the premiums on their tenants' insurances in lieu of making them allowances or gratuities, in case of loss, as heretofore; and were landlords invariably to make it a condition that all their tenants should insure their live farming stock against loss from disease or accident, they would find it an additional security to themselves of no small magnitude.—Agriculturist.

PRESERVATION OF VEGETABLE SUBSTANCES, EGGS, MEAT, &c.

We have this week to record the extension of a system of preservation which has been gaining in public estimation for several years, but which has been limited in its use by routine difficulties. We refer to the patent process of Messrs. Davis and Symington.

The distinguishing feature of this system consists in causing currents of air, heated to any degree of temperature, to pass in rapid contact with the bodies or substances requiring desiccation, such as timber, cloth, yarns, &c., or needing preparation by heat for alimentary purposes, as coffee, cocoa, biscuits, &c. The mere application of hot air to such uses was, of course, no novelty; hot pipes, hot plates, hot chambers, of an infinite variety, had been before used. But the hot air, when once admitted into any place, was commonly left to find its own way out, by virtue of its own ascensive power. Now, what Messrs. Davison and Symington did was to give velocity to the hot air—a velocity much beyond what is natural to it under any circumstances; to cause it to do its duty more rapidly and more effectually—to pass away as fast as it becomes charged with the aqueous particles extracted from the substances under operation. By no one before had this been done so methodically and so successfully—with so clear a perception of the true principles of artificial evaporation, or so business-like an application of it to practice.

In addition to the introduction for the first time of a self-acting mercurial gauge, and to the adaptation of the process to the art of baking, coffee-roasting, &c., we have the following improvements:—

1. "An improved method of applying rapid currents of heated air to the desiccation and preservation of animal substances."

If the substances are of large bulk, such as carrots, turnips, parsnips, &c. (but excepting always potatoes), we first wash them, and also scrape them when necessary; next cut or slice them by hand, or by any suitable machinery, and then lay them in thin layers upon trays (with haircloth or lattice-work bottoms), and place these trays on racks, one above another, in the heating chamber. When thoroughly desiccated they may be then either put up in packages, or, previously to packing, be reduced to a very comminuted state; and in either case it is desirable that the packages should be made air-tight. To preserve potatoes, we prefer first to boil or steam them, then to peel them, and afterwards to wash or otherwise reduce them to a state fit for spreading in thin layers upon trays, of the same description as those employed in the preceding process. We then expose these trays, with the substance or material, to impelled currents of heated air, as before described, at a temperature of about 150° Fahrenheit, till the substance or material is thoroughly desiccated. If the substances or material are of small size—such as pulse, peas, or beans—we expose them in their entire state to the rapid currents of heated air.

The next part of the invention consists of

2. "An improved method of applying rapid currents of heated air to the preservation of meats."

We find it most convenient first to cut the meat when bulky into slices of about half an inch thick, and hang these slices on lines or rails, where we expose them to rapid currents of heated air. The temperature we find most suitable is from 120° to 160°, but it should not much exceed the latter degree. All moisture is by this means completely expelled from the meat, and its albumen, at the same time, firmly coagulated. Meat which has been so treated will continue for a long time, under ordinary circumstances, in a perfectly wholesome state; but, if intended to be exported to damp or variable climates, we recommend that it should be treated with a little highly-diluted pyroligneous acid, or some other approved antiseptic, to prevent it from reimbibing humidity; after which it should be subjected to a further heating, in order to free it from any moisture which the acid or other antiseptic may have imparted to it. To ascertain when the meat has been perfectly dried, a portion of it may be weighed at intervals, and when it ceases to show any diminution of weight the process may be deemed complete.

The last improvement concerns what we shall expect to see an article of very general demand for household purposes; it is

3. "An improved method of applying heat to the preservation of the edible matters contained in eggs."

We first strip the eggs of their shells, then intimately mix together the yolks and whites; next add about an equal weight of wheaten flour, ground rice, or other farinaceous substance, and beat up the whole into an uniform mass, which we spread upon trays with horsehair cloth or lattice-work bottoms, and then expose the mass so spread out to a temperature of about, but not much exceeding, 180° Fahrenheit (whether the heat is applied in rapid currents or not is in this case a matter of in-

difference). When thoroughly dried, the mass is reduced to the state of flour; and in that state packed up for use. Or, instead of thus mixing up the yolks and whites of the eggs together, we preserve them separately; following the same process in regard to the mixing of each with flour or other farinaceous substance, and then desiccating the compound mass, as has just been described. Or, instead of adopting either of the preceding processes, we desiccate the eggs in their entire state, denuded only of their shells, or the yolks and whites separately, and then reduce them to a state of flour without any intermixture with other substances.

THE PHENOMENA OF PUTREFACTION.

BY M. DUMAS.

Organic substances, whether vegetable or animal, undergo no change so long as they are preserved from contact with air and moisture. We even possess but few examples in organic chemistry of an absorption of oxygen by perfectly dry substances; yet nearly all of these matters become altered, in the long run, under the combined influence of moisture and of atmospheric oxygen. The phenomena which characterise this kind of alteration are extremely varied. They are, in general, designated under the name of *fermentation*—a condition in which the action of oxygen is limited to the production of a ferment capable of determining by its simple contact a molecular movement in the substance at the expense of which it is formed. But where oxygen intervenes throughout the whole course of the reaction, and where the phenomena of simple fermentation become complicated with those of combustion and of slow oxidation, we distinguish by the name of *putrefaction* those more complex decompositions which are effected in such cases. We all know the external characters by which decomposition of this kind is manifested. Animal matters in a state of putrefaction exhale a fetid odour, at the same time that they change in colour and in consistence. They pass through a series of alterations, uninterrupted by yielding volatile products, until the organic matter becomes reduced to a species of earth dissimilar to everything it has previously presented. Thus, a body, when placed in conditions favourable to its putrefaction, will, after abstraction of its mineral matters, shortly leave but a very slight residue, which itself disappears altogether after some time. The atmospheric oxygen is, under different titles, the agent of these decompositions. Its presence is indispensable for complete putrefaction to take place. But, as we have already remarked, the phenomena of oxidation are not the only ones which characterise putrefaction. During the course of the putrid decomposition, there is effected in the animal matter a true fermentation, the intermediate products of which are still unknown; but, so soon as oxygen intervenes in this molecular movement, it gives birth to water and to carbonic acid—the extreme products of oxidation of organic substances. As to the nitrogen, it unites with a certain quantity of hydrogen, and is disengaged in the form of ammonia. Water, carbonic acid, and ammonia, are then the ultimate products into which animal matters, in a state of putrefaction, become resolved. These matters, which are in general of so complex a nature, return, as we see, to the inorganic state whence they had been elaborated by the vegetable world. It is thus that the study of putrefaction, which at first sight appears calculated to inspire only sentiments of repugnance, acquires a peculiarity philosophical interest, by revealing to us a chain of phenomena most admirable in their simplicity.

When the body of an animal of large size is abandoned to itself in the open air, numerous flies, attracted by the odour of its flesh, congregate to deposit their ova in its substance. These quickly give birth to myriads of larvæ, which devour the flesh of the animal, and which, being in their turn transformed into flies, disperse themselves by swarms on all sides, and thus disseminate the azotized matter of the body which has nourished them. And, if we further observe these very flies perish, at a later period, caught in the webs of the countless spiders which spread their nets at a short distance above the surface of the ground, amidst the stems and leaves of the plants, one is struck with admiration on discovering by what sure and simple processes the roots of the plants, which by their leaves support these webs, have received their share of the azotized matters which threatened to become concentrated in excess on one single point of the earth. The insects which live upon the dead carcasses of animals are thus made the distributors of the azotized matter, dividing it into minute and countless particles, which are subsequently, so to speak, rained upon the soil as a fertilizing shower.

Under a more concealed aspect, putrefaction leads to the same results. It, in like manner, creates or nourishes myriads of animalcules, which by their

vitality determine the combustion of the organic matter in which putrefaction is established, and which in themselves serve as an intermediate stage for its conversion into carbonic acid, water, and nitrogen, or ammonia. That which we call a putrefied body is oftentimes composed of an innumerable mass of acari, which have been created at its expense; and which, in their turn, disappear, to give place to a generation of beings still lower in the scale of life. These various changes, however, are not effected without the loss of certain portions of the carbon, of the hydogen, and of the nitrogen, which were originally combined together.

Thus, the animal matter, after being again taken up by the plant, furnishes food for the herbivorous animals, but not without a considerable part of this matter returning in a burnt state to the earth or to the air under the form of carbonic acid, water, ammonia, or mineral residue. To these herbivora succeed the carnivora, which live at their expense, and which, even during their lifetime, return a great part of their substance to the mineral kingdom for its support, and after their death give up their bodies to new generations.

Flies, acari, and various microscopic insects are in this way called into existence: and thus does life become sustained and propagated over the face of the globe, at the same time that the animal matter is being unceasingly divided and constantly burned for the purpose of furnishing on all sides carbonic acid, ammonia, and certain salts to the plants which have need of these bodies for their development.

During the entire course of putrefaction, the volatile products which are disengaged exhale a fetid odour, owing probably to the presence of sulphur and of phosphorus in these miasmata; moreover, there is formed some sulphuretted hydrogen. As to the disengagement of phosphoretted hydrogen, on which would depend the so well-known phenomena of *ignis-fatuus* in our churchyards, and which must be owing to the decomposition of animal matters containing phosphorus, we cannot yet speak with certainty. When putrefaction is accomplished in the presence of basic substances capable of determining the formation of an acid, we remark among the number of its products a certain quantity of nitric acid, which remains united to the base. The formation of this acid is due, in this case, to the oxidation of the ammonia, one of the products of normal putrefaction. We know, in fact, by the experiments of M. Kuhlmann, that ammonia is capable of undergoing this kind of oxidation; for, if we pass a stream of this gas over a piece of incandescent platinum, we have a formation of nitrate of ammonia. We may thus explain the efficacy of animal matters in natural and in artificial nitre manufactories. There is no doubt that in the artificial nitre-works the presence of alkaline bases exercise a marked influence over the phenomena of putrefaction, whether in accelerating its progress, or by modifying the nature of the products to which it gives birth.

Such, however, is not always the case. Certain alkaline substances may, by an action in some sort inverse to that which we have just been considering, determine in some animal matters modifications capable of retarding, or even of preventing, putrefaction. Everybody knows that we may preserve eggs by plunging them in lime-water, made by adding ten parts of water to one of slacked lime. Does this base act by giving birth to a deposit of carbonate of lime, which preserves the animal matter from contact with the oxygen, or by forming with the membranes compounds at once impermeable and imputrescible?—this is a question which has yet to be resolved. Still, as experience has shown that this process of preservation, although perfectly effectual with the egg of the domestic fowl, is quite useless with that of the ostrich, we may suppose that the action of the line on the albumen has something to do in this phenomenon. The great thickness of the shell in the egg of the ostrich would prevent this action being accomplished.

Many other substances are capable of retarding putrefaction. These are generally designated under the name of *antiseptics*. We may cite more particularly the mineral acids, a great number of salts, among which we should especially mention chloride of sodium, the salts of alumina, iron, copper, and mercury, aromatic substances, empyreumatic oils, creosote, essence of turpentine, alcohol, &c. All these substances act either by combining with the animal matters to form more stable compounds, by seizing upon its water, or by coagulating and contracting the animal tissue, and thus facilitating its desiccation. In the same way as tannin forms with gelatine an insoluble compound, which constitutes non-putrescible leather, so does corrosive sublimate combine with the albuminous tissues, and preserve them for a long time from the action of atmospheric agents. The sulphate of the peroxide of iron acts in an equally efficacious manner; but its employment in anatomical preparations offers some inconveniencies. The same may be said with regard to corrosive sublimate, which would present an obstacle to the subsequent dissection of the parts whether by occasioning a deposit of mercury on the surface of the knife, or by converting into a chloride the iron or steel of the edge of the instrument. But, if it be our wish simply to preserve the body against the ravages of putrefaction, corrosive sublimate will be found an excellent agent. Thus, it

has been employed with success in embalming bodies, whether by injecting it into the vascular system, or by plunging the entire subject into an alcoholic solution of the salt, taking care to add fresh quantities of the latter in proportion as it becomes absorbed by the body which we wish to preserve. It is further advisable to remove the viscera, and to make free incisions into the body, so as to facilitate the absorption of the mercurial salt, one or two pounds of which may be added daily to the liquor. At the end of three weeks or a month the body is to be taken out, when it will be found to dry very quickly, without losing its natural colour.

Other means have been employed for embalming bodies. We know that the ancient Egyptians made use of balsamic and resinous substances for this purpose; this is evidenced by the analysis of the mummies themselves.

The researches of M. Gannal have shown that, among the materials which may be employed for this purpose, the salts of alum, and especially the sulphate and the acetate, answer remarkably well to preserve a body for dissection. M. Gannal injects by the left carotid from five to six litres of a solution of acetate of alumina at 18° of the areometer of Baumé. The subject thus prepared will keep for five or six months. If subjected to a dry air it will part with all its moisture, and become converted into a true mummy. We may with advantage replace the acetate of alumina by the sulphate, which is less expensive, and which, employed in the proportion of a kilogramme to four litres of water, will suffice to preserve a body for a couple of months.

For the preservation of anatomical preparations, or that of objects of natural history, M. Gannal recommends the employment of the following liquids:—A solution of sulphate of alumina marking 6°, that is to say, containing a kilogramme of this salt to six litres of water; a solution of sulphate of alumina in water saturated with arsenious acid; lastly, a solution of acetate of alumina marking 5°, and saturated with arsenious acid.

The employment of arsenious acid, however, is liable to great objections, which should render us very circumspect in its application. In fact, in simply embalming a body we should always proscribe its use, for the introduction of arsenious acid into the materials of this operation would serve to conceal the traces of crime. Also in the preservation of a body for the researches of the anatomist, or in that of some object of natural history, with a scientific view, there is always fear lest the person who may subsequently devote himself to its dissection should become the victim of inoculation of this poison from some wound accidentally formed during the dissection. If, then, we reject the intervention of arsenious acid, the process of M. Gannal will be reduced to the employment of the aluminous salts, which are, in fact, sufficient.

M. Sucquet has recently ingrafted on this process a modification of such importance that it constitutes, so to speak, a new invention. In fact, by injecting a solution of sulphite of soda into the vessels, and then steeping the preparation in a solution of chloride of zinc, not only does the flesh become preserved, but it even maintains its volume, its suppleness, and its elasticity. We may then, by this process, produce anatomical preparations of extreme beauty and fidelity, in which the original appearance of the part itself is presented to great perfection. Numerous examples of this kind may be found adorning the new museum of the Faculty of Medicine, and which show that, if such products are not absolutely unalterable in the air—a fact which time alone can prove—at least they are capable of resisting for more than a year all causes of destruction without in any way experiencing the smallest symptom of change.

M. Sucquet has, by this discovery, rendered a very important service to comparative anatomy. The study of the muscles and of the viscera will henceforth offer the same facility as that of the skeleton, since all the fleshy or soft parts are protected from that spontaneous decomposition which destroys or modifies them so speedily.

M. Robin has recently laid claim to the priority of the invention above referred to. Without pronouncing an opinion on this question, I may remark that M. Robin counsels the employment of a salt which is well deserving of trial, viz., the hyposulphite of zinc, a salt which is very readily obtained by the action of sulphurous acid and water upon metallic zinc. If the salts of zinc and hyposulphurous acid are in their separate form found to be of great efficacy, then every thing would indicate that the hyposulphite of zinc should be so in a high degree; we must, however, on this point, await the results of experience.

We know that in the preservation of the soft parts spirits of wine are generally made use of. By robbing them of their water, and producing a state of contraction in the albuminous tissues, this liquid serves very well for preserving animal matters, which are, moreover, in this way, protected from the action of the air; but its employment is expensive; and where we wish to act upon parts of large size, the liquids proposed by M. Gannal present considerable advantages.

In embalming, properly so called, the processes adopted by M. Gannal are based upon the employment of the salts of alum; but the details of this operation, the precautions which it is necessary to employ to preserve to the tint its natural freshness,

to the limbs their flexibility, &c.—those proceedings, in fine, by which, after the lapse of several months, the body, previously impregnated with liquids, becomes dry, without turning mouldy or disfigured—all these things remain the property of the discoverer, who has, moreover, on various occasions applied his process with great success.

It is well known that Reinsch discovered some process for embalming bodies, which he carried to such great perfection that his collection was for a long time the admiration of Europe. Peter the Great purchased it; but the vessel laden with this curious cargo was wrecked on its passage. Thus, not only were the subjects prepared by Reinsch lost to science, but so also were the means of discovering his process, and of which he has himself, unfortunately, left no account behind him.

We must not, however, confound the chemical processes recently discovered with those systems of embalming practised in modern times, and which, for the most part, possessed but little efficacy. We know that these systems were generally founded on the employment of odorous powders, resins, or balsams. Now, should these matters themselves have resisted putrefaction, the same cannot usually be said of the substances which they were intended to preserve. Thus, the heart of Richard Cœur-de-Lion, which is preserved at Rouen, shows at the present day scarcely a trace of organic matter, but is composed solely of incense in a state of powder or small particles.

The processes used by the Egyptians form a separate class. It would be necessary to institute an exact analysis of some of their mummies, to be able to explain them in a satisfactory manner.

The *preservation of aliments* is a question even more important than that which we have just been studying. The means which are employed for this purpose consist in reducing the alimentary substance to a state of desiccation, which renders it less apt to change, or in preventing the formation and the action of ferments, by protecting it from the oxygen of the atmosphere. The addition of common salt to meat is known to favour its desiccation. In fact, the solid salt seizes on the water with which the fibres of the meat are impregnated, and forms a concentrated solution, which, by evaporation, deposits crystals of salt in all parts of the meat.

Hales endeavoured to inject a saturated solution of salt into the vessels of an ox, hoping that the flesh, seasoned in this manner, would become capable of a lengthened preservation; but experience soon taught the inefficiency of this proceeding, which was subsequently abandoned. We may, however, presume that such a method would succeed if the re-agent thus introduced into the tissues possessed a sufficiently antiseptic power—that is to say, one superior to that of salt itself. Unfortunately, almost all the substances which counteract the putrid fermentations, in like manner prevent those fermentations which should be accomplished in the alimentary organs, and which constitute the phenomenon of digestion.

Everybody knows that fumigation or smoking is an excellent means of preserving meat. It appears evident that it is the creosote which chiefly communicates to the smoke its antiseptic properties. This body possesses, in fact, the power of coagulating albumen, and rendering all animal substances imputrescible.

We have seen that the presence of oxygen is a necessary condition to the production of the phenomena of putrefaction. Should the organic matter be protected from this re-agent, the azotized ferments have no power to become developed in it. M. Gay Lussac long since proved that by boiling milk daily, so as to drive off the air which it holds in solution, this fluid may be preserved for a long time. Before him, Priestly had discovered that putrefaction was not manifested in an atmosphere of deutoxide of nitrogen. M. Desbassins de Richemond had even attempted, some years previously, to make use of deutoxide of nitrogen as a medium of preservation for fish, where it was necessary to transport them to great distances; as, for instance, from the seaport towns to Paris. Whatever intrinsic value such a proceeding might possess, it was in itself so little manageable that it was speedily laid aside.

A more valuable application, however, is that of a solution of *aldehyde*. This body, in fact, promises some day to enjoy an important influence over the preparation and preservation of our aliments. Its action is to absorb oxygen, and by this absorption it becomes converted into vinegar—two very energetic causes of preservation.

M. Sucquet has recently derived most satisfactory results from the use of sulphurous gas as an antiseptic re-agent; indeed, its utility in checking putrefaction might have been easily conjectured. He contents himself with injecting into the blood-vessels a solution of sulphite of soda; this alone has sufficed to correct the effects of an already advanced state of putrefaction, to arrest its further development, and to maintain the body in a good state of preservation for several weeks, notwithstanding the contact of a humid and heated atmosphere. We have merely to repeat the injection to prolong the duration of this preservation. As the sulphite of soda is a body incapable of injuring the instruments used in dissection, the employment of this process, which is at once economical and safe, is likely to render great services to the study of

anatomy. It will allow of our devoting ourselves to the most prolonged and minute dissections without danger or unnecessary precipitation.

M. Appert has discovered a process of preservation for alimentary matters, which is based on the simple principles we have just been enunciating. He found that, for preserving most kinds of food, we have merely to place the matters in a vessel, of which the lid is to be soldered down, and which is subsequently to be placed in water, the temperature of this liquid being gradually raised to about 100° C. It is to be maintained at this point for about an hour and a-half or two hours. All the oxygen which might have existed in the vessel is thus removed, and will be found converted into carbonic acid. It is evidently to this conversion of oxygen into carbonic acid that we must attribute the preservative power of this process. The slightest trace of oxygen would cause a change which, although trifling, would not be the less real. We should, therefore, rather prolong the period of ebullition than seek to abridge it.

In England the vessels employed for this operation have a lid pierced with a hole which is itself fitted with a smaller covering. The larger lid is soldered down after having introduced the solid aliments, and any liquids which are found there are poured off through the hole; the latter is then closed up by soldering over it the smaller lid.

This process, which is of such great value in a host of cases, is, however, not applicable with all alimentary matters. Thus, milk is found to be ncapable of being preserved by this means. We can also understand that it would be perfectly inapplicable to the preservation in a natural state of the softer kinds of fruit. Besides being of such easy application, this process has further the advantage of not introducing into the food foreign substances which are capable of altering its taste.

Meats preserved in the foregoing manner are undoubtedly fit to be presented on the most dainty table after being kept for fifteen or twenty years. I have more than once made the experiment myself. Those naval officers, however, who have had occasion to make use of them aboard ship are all agreed to declare the continued use of this species of aliment most disagreeable. They find that a peculiar officinal taste, proper to these meats, excites in the long run a true repugnance if their use be persevered in. They prefer meat salted in the common manner.

It would appear that animals killed towards the middle of the night furnish meats which are better capable of preserving than do those which are slaughtered in the day-time. This circumstance is very singular; for it proves that the meat most suitable for preservation is that which is extracted from the animal when its respiration is least developed, and its temperature is at the lowest point. We all know that the flesh of an animal, when killed after prolonged running, is, on the contrary, very unfit for keeping—a proof that a quickened respiration and a highly-developed temperature are conditions unfavourable towards its preservation.

It evidently results from the foregoing facts that meats impregnated with air, or with a highly-oxygenated blood, are much less fit for preservation than are those which are found under opposite conditions. Hence we may conclude that the process of insufflation, by means of which butchers almost always separate the skin from the flesh, must infallibly present grave inconveniences, since it tends to introduce into all the tissues that air which so readily excites their putrid decomposition. It would be curious to compare the length of preservation of the flesh of some animals insufflated by means of gases devoid of oxygen, such as nitrogen or carbonic acid, with that of animals which had been insufflated by ordinary air. Everything leads us to believe that the former would be capable of much longer preservation than the latter.

In respect to the process of M. Appert, it would, perhaps, be advisable to create a vacuum in the vessel, before filling it with the gas. This vacuum might be maintained for some time, so as to remove the condensed air from the tissues. The vessel should then be closed, and heated in a sand-bath.

The preservation of certain vegetables, such as green peas, has been largely carried out since the method of Appert has been generally known: its success, indeed, is so great that nothing further can be desired in this respect. The same may be said with regard to preserved fruits, which may be kept for several years without our being forced to increase the proportion of sugar. We thus find that, by combining the preservative power of a portion of sugar which in itself would be insufficient with that which results from the complete destruction of the oxygen contained in the vessel, we may succeed in preserving the fruit for the space of an entire year or upwards. Very considerable quantities of fruit will thus become consumed which would otherwise be without value, besides that we shall give to the consumption of sugar an impulse of which the full importance is not yet understood; for when these preserves shall, from the abundance of fruit in some places, and the lowness of its price, have become sufficiently popular to take their place on the table as ordinary articles of diet, we shall be surprised at the extraordinary consumption of sugar to which they must give rise.—Pharmaceutical Times.

MR. HODGSON'S REPORT ON DEODORIZING-FLUIDS.

The following is the report returned by Mr. Hodgson to the Metropolitan Sewers' Commission, on the efficacy of three of the most vaunted "deodorizing fluids." The commission attach considerable importance to it, and have ordered it to be printed :—

"Strand, April 19, 1848.

"Sir,—In compliance with your wish to that effect, I beg to submit the following comparative statements regarding the disinfecting and deodorizing qualities of certain fluids submitted to the Honourable the Commissioners of Sewers, for the purpose of destroying the noxious effluvia evolved in removing night-soil from cess-pools.

"The liquids tried were those of M. Ledoyen, Mr. Ellerman, and Sir William Burnett. One week was allotted to each for experimental inquiry, and the average of their respective values was based upon their powers of destroying or decomposing sulphuretted hydrogen, whether existing in a free state, or in combination with ammonia in the soil.

"The fluids were applied by the agents of the parties referred to, and in the way which they severally considered best, until the desired effects were obtained.

"The following is a tabular view of the result of each series of experiments :—

	Cubic yds.	ft.		qts.		
Ledoyen..	33	18	required	197	=11.52	Per cubic yard.
Ellerman .	35	5	"	96.50	= 5.48	
Burnett ..	19	23	"	11.75	= 1.15	

"Unavoidable circumstances prevented the full number of experiments from being made with Sir William Burnett's fluid; but I feel convinced that, had they been fully carried out, the average quantity of fluid used would not have been one pint to the cubic yard.

"On examination I found that Ledoyen's fluid consisted of a solution of nitrate of lead, of specific gravity 1.250. It imparts a yellow colour to the skin, and destroys linen and similar fabrics, on account of its containing an excess of acid. Its poisonous qualities, like the salts of lead generally, are well known. It is readily decomposed when diluted with ordinary water, or mixed with the liquid soil, on account of the formation of insoluble salts, which of necessity renders the employment of a large quantity absolutely imperative. I am not informed as to its price, but it must be more expensive than the other solutions.

"Ellerman's fluid consists of per-chloride and acetate of iron, the latter in the proportion of about 10 per cent. It has a strong tarry odour, a deep brown colour, and strongly tinges the skin and textile fabrics, which latter, like Ledoyen's, and from a similar cause, it corrodes and destroys.

"Its specific gravity, I find, varies from 1.400 to 1.500; its price, as offered to the public, is 1s. 6d. per quart bottle.

"Sir William Burnett's fluid consists of a solution of chloride of zinc, colourless, inodorous, and contains no excess of acid. It therefore does not stain nor corrode linen and similar fabrics, like the other before-mentioned salts, and, on account of the large quantity of salt contained in a small space, it has the great advantage of extreme portability. Its specific gravity is 1.600, and the price at which it is offered to the public is 3s. per quart bottle.

"I beg to enclose the calculations upon which my conclusions are founded, and to remark, in addition, that as the decomposition of sulphuretted hydrogen has been assumed for the purpose of estimating the relative worth of these proposed fluids as disinfectants, it would at first appear the most simple plan to test them by a direct application to that substance, or merely to take their chemical combining quantities as a guide, without further experiment; but such, I apprehend, would mislead in these cases, as, from the varied composition of night-soil, the action of the fluids appears to be greatly changed and modified, so as to render such trials as have been made, in my opinion, the only practical methods of approximation.

"I have the honour to be, sir,
"Your very obedient servant,
(Signed) "CHARLES JAMES HODGSON,
"Member of the Chemical Society of London."

APPENDIX TO MR. HODGSON'S REPORT.

"406, Strand, April 29, 1848.

"Sir,—With regard to the power of night-soil as a fertilizing agent, after it has been submitted to the action of the fluids referred to, the modification it undergoes by the addition of those agents, and to explain how far the change produced may affect the night-soil as manure.

"The metals, lead, iron, and zinc, in solution, combine more especially with the sulphur existing

in the night-soil, as sulphuretted hydrogen and hydrosulphate of ammonia, while the acids previously combined with metallic bases sieze and fix the ammonia.

"The fertilizing agent, ammonia, is thus enabled to assume a state most useful to the land, while the metallic sulphurets, being insoluble, cannot interfere with vegetation.

"Upon this principle it might be at once assumed that the metallic salts could be valued by referring to their chemically combining proportions, when applied to the purposes referred to; but in practice such is not found to be the case, inasmuch as certain complicated reactions ensue which interfere entirely with our preconceived notions upon the subject.

If the metals in each case were affected only by the sulphuretted hydrogen and hydrosulphate of ammonia, their actions would be readily traced, as pointed out above, and the quantity required could be easily estimated; but, as some of these fluids are taken up by other substances in the soil besides the sulphurous compounds, and therefore used in waste, it follows that the metallic solution which is the most free from this objection is obviously the best to use; and the former part of my report, in the tabular views I have therein given, points out which of the metallic solutions is preferable in this respect.

It would thus appear that, independent of the disinfecting properties of these solutions, their agency in exalting the power of night-soil as manure is of the utmost importance to the agricultural interests of the country.

"Allow me to remain, sir,

"Your obedient servant,

"CHAS. J. HODGSON.

"J. Roe, Esq., &c., &c."

RED WATER IN CATTLE.

For the past few weeks, red water in cows, the second or third week after calving, has prevailed to a considerable extent in this district. This disease has been usually divided into the acute and chronic, the former of which at present prevails as an epidemic, and has been fatal in several cases. Like many other diseases, the state of the atmosphere must exercise a powerful influence, it being seldom found that one dairy is attacked without others in the neighbourhood also suffering.

The causes are obscure and difficult to discover. It is generally attributed to the nature of the food, and sometimes to the presence of acrimonious and poisonous plants, drinking bad or stagnant water, to the scanty supply of water on dry soils, low marsh lands, &c. The presence of the complaint, at this time, however, shows that it is not always connected with these exciting causes, as the animals are not yet turned out of the byre, and consequently are more likely to be free from these evils. It seems closely connected with the change which takes place in the cow after calving, and probably also a degree of indigestion, and we would therefore recommend that a dose of purgative medicine should be given to every cow immediately after calving, especially during the prevalence of this epidemic.

Acute red water prevails mostly in spring and autumn, and in cows after calving; and as the disease is at present prevalent, farmers should be very careful to guard against the first symptoms of it.

It generally commences with diarrhœa, which is very soon afterwards followed by obstinate costiveness, at which time (but sometimes at the beginning of the complaint) the water is seen to be red. There is also a considerable degree of fever, with tenderness of the loins, coldness of the extremities, &c. In the early stage the pulse is strong and full, evidently indicating blood-letting; but when the disease has been neglected for a short time at the first, it is found weak and feeble, and the animal suffering from weakness. In all cases of high fever, when the pulse is full, quick, and hard, bleeding should be resorted to, followed up by purgatives and other antiphlogistic means. But as the disease is often considerably advanced before proper remedies can be applied, and as frequently great weakness has ensued from the passing of so much blood with the urine, the expediency of bleeding is, at least in such cases, very doubtful. Purgatives, however, combined with aromatics, must be persevered in. A good dose of Epsom salts, combined with ginger and carrui, should be given, followed by half-pound doses every eight or ten hours, until the bowels are thoroughly acted upon. This frequently does not take place till these medicines have been persevered in, sometimes for three or four days; the commencement of purging is generally the sign of recovery.

On examination after death, the contents of the manyplus are sometimes hard and dry, and at other times partially so; the kidneys have a blanched appearance, and sometimes one or both show spots of intense inflammation having existed; the uterus in

cows recently calved is found very often inflamed and ulcerated.

Chronic red water is the form which this disease more generally assumes. It is principally a disease of the digestive organs, mostly confined to the third stomach, or manyplus—and the liver also generally suffers. The urine appears mostly of a brown or *porter* colour. In many cases a simple purgative immediately removes it, and indeed a natural diarrhœa often ensues with the same salutary result.

In more violent cases, and such as are generally fatal, the diarrhœa has suddenly stopped, and given place to a severe and obstinate costiveness, which it is exceedingly difficult to overcome, requiring aromatic and purgative medicines, and more frequently repeated.

As however, it is the acute form which at present prevails, it is unnecessary to add anything further on the chronic.—Ayrshire Agriculturist.

BOTLEY AND SOUTH HANTS FARMERS' CLUB.—DISCUSSION ON THE IMPROVEMENT OF POOR PASTURE LANDS.

At the Monthly Meeting of the Members of this Club, Mr. James Warner, the president, in the chair, there was a good attendance of members, and some additions were made to the subscription commenced at the previous meeting for extra prizes at the next turnip show.

The CHAIRMAN called on Mr. Jackson, of Southampton, formerly of Lodge Hill Farm, Kent, to introduce the subject for discussion—The best Method of improving poor Pasture Lands.

Mr. JACKSON said that in approaching this subject he could not but feel great difficulty, for it was one on which, as an individual, he was seeking for improvement. His offering himself thus prominently to their notice, arose out of the circumstance of his asking a question of Mr. Wooldridge; and when he was asked to open this question, it would be remembered that he stated his inability to deliver a lecture. His promise to the club was this, that he would endeavour to promote a discussion. That promise he would now endeavour to fulfil. The subject of the improvement of poor pastures was one of great weight to farmers. He had heard an observation in that room, from the lips of a farmer, "Think of your arable lands, the pastures will take care of themselves." Now he took leave to differ from that remark: most certainly it had not a general application. They would remember the old adage, that "if a farmer had good grass crops he had manure heaps." There were seldom good dung heaps without good hay crops. The question then arose, what is the best mode of putting a fair crop upon a poor pasture? He need not observe to them that pastures varied in the nature of the soils, and that some were too wet and others too dry. The fact was beyond the point of controversy. He should divide the subject into two heads—the first was Management, the second Manures. In management must be included the very important process of thorough draining. He recommended, as far as his own experience went at Lodge Hill meadows, both top and under draining. This was an essential improvement, as many of the artificial manures would not act upon wet land. With regard to uplands, he was decidedly in favour of folding and close feeding with turnips and hay; for by this system the moss was destroyed and the large coarse-tufted grasses eradicated. The next branch of management which he recommended was harrowing with sharp tined harrows, three or four times in a place, spreading afterwards some warm compost, and then sowing some seeds, following with the drag and roller. The harrows opened the soil and admitted fresh air to the root of the plant. Opening of the land did as much good almost as the taking of the water from it. He knew that many objected to rolling, but he was assured that it improved the quality of the grasses. Let them look to a footpath across a pasture; the pressure produced the best and sweetest of grasses. He spoke in favour of alternate ploughing and laying down, in regard to some lands, in ridges, with a water furrow. In this observation he alluded especially to heavy clays; the land was improved by turning it the sweet side upwards. He had tried the experiment successfully on sixteen acres of wet land at Lodge Hill. He drew attention to a great improvement effected in some marsh-lands by casting upon them a liberal supply of ditch soil. He next came to the second branch of the subject. Manures were of two classes—natural and artificial First, in respect to natural manures, it was held to be good farming to consider the nature of the soil in the first instance, and then to apply warm manures to cold lands, and *vice versâ*. First, as to the application of clay; which should be applied to sandy and peaty lands in autumn, and well worked in the spring. Secondly, chalk; which was most efficacious in some lands, also on lands abounding in clay, sand, and peat. The failure of intended improvements by chalk frequently arose from the circumstance of there being already sufficient chalk in

the soil. The best chalk was of a soft unctuous quality, and free from magnesia. The chief benefit arose from the circumstances that it loosened and ameliorated the soil, and sweetened the produce; it did not, however, answer a second time. Thirdly, as to sand; and in reference to this he called attention to the fact, that when thirty loads had been applied to a cold peaty soil, a good crop of sweet grass and white clover was the result. Fourthly, as to ashes. Wood ashes were more beneficial than others, because they contained a considerable quantity of the phosphates of lime and magnesia. Hazel, for instance, was said to contain 35 per cent. (Hear, hear, from Mr. Spooner), and oak 25 per cent. Now, they were aware that phosphate of lime was the chief fertilizing property in bones, which contained about 37 per cent. in the ox bone. Wood ashes also contained a considerable portion of potash, a salt more or less present in all vegetable substances, and which must, therefore, be highly serviceable for food. Carbonate of potash promoted the distribution of dead vegetable substances, and from its attraction of moisture from the air must promote an increased supply of food. Peat ashes were of use on some soils, and owed most of their fertilizing properties to the presence of gypsum, or sulphate of lime; its other constituents were earths, with varying quantities of sulphate of potash, and a little common salt; at Kennett, in Berkshire, they were considered the best top dressing for grass that could be used, say 40 or 50 bushels to the acre, at 3d. or 4d. per bushel; but he should consider gypsum much cheaper. Some writers spoke highly of ashes of burnt clay, but he really could not bear them out by his experiments on Lodge Hill Meadows. Ashes from the soap boiler did not properly come within this class; they had, however, been recommended as very useful on stony cold soils, such as peat, moss, and the like. He next came to marl, so highly spoken of by some agriculturists; it was said to throw the land into a state of fermentation, and frequently changed its very nature. He believed that it was not so much in use now as formerly. Sixthly, as to composts; and he need not enlarge upon the advantages so often derived from the scrapings of ponds and ditches. Seventhly, came the most important of all home fertilizers, liquid manure; and although it was the most important help for the farmer, too true it was that it was the most neglected. He had now come to artificial manures. In the first place he would say a few words about bones. He went on to speak of the fertilizing properties of bones (often alluded to in our columns), and of the known advantages of their application. Then as to soot, this derived its fertilizing qualities from the salts of ammonia which it contained, and it was a very useful dressing; but the refuse of the gas works and ammoniacal liquor had in some degree superseded it in some places, in Scotland in particular. Saltpetre had been spoken of as an inexplicable manure in regard to cause and effect, inasmuch as it did not absorb moisture from the atmosphere; neither was it known to produce putrefaction, or to enter into the composition of commonly cultivated crops; yet it had been much used in Essex, and, according to report, with success, as a sweetener of grasses. Lord Dacre had used it on an old grass in his park, and the result was an extraordinary crop of hay. On clays and cold land it was said to be of no use. Nitrate of soda was nearly the same in effect, and came to nearly thirty per cent. less in cost. It was tried by Lord Dacre against saltpetre, and found to yield as good a crop of grass (Hear, hear). The Earl of Zetland had likewise tried it upon grass land with good effect. Salt was one of the oldest manures, and was referred to in the bible. Cattle preferred grass grown upon salted land, but if used too liberally then that destroyed the herbage. He thought it might be made useful in destroying coarse grass and rushes, and as a sweetener of herbage. Two parts of lime and one of common salt was considered a good manure. In the "Farmer's Guide," published in 1768, was this passage—"Now I come to treat of the mother of all manures. Take six bushels of salt, six bushels of lime, and six bushels of ashes, dry, mix them together; this is sufficient for an English acre." Now old sayings were not always to be despised. On the sea coast it is a common practice to slack lime with salt water for manure. The speaker then remarked upon gypsum. It was sometimes quite useless, because its properties are previously in the soil. On lands deficient in gypsum they must not expect to reap a crop of grass. It was unproductive on dry soils, and answered best on chalk. A gentleman in Berkshire states he applied two hundred weight to an acre of parkland where farm-yard manure showed no good effect, and though sown in a hot and dry time—in July—in November it produced a luxuriant crop of grass. Although last, not least, came guano. This valuable manure had been in use for centuries abroad; it was mentioned by Pizarro as in use at the time of his conquest. It was applied, in Peru, by hand to the roots of plants, and immediately watered. And this gave them a hint as to the time when it should be applied—in damp and wet weather. Guano without rain was of no use. He recommended it to be sown broadcast with ashes. The only failure he knew of was in a case where it had been drilled. Nitrate of soda abounded in Peru, yet the farmers there never thought of using it so long as they could get guano. In reviewing

the subject there was no manure he could so fully recommend as guano; it was the quickest in operation and the most beneficial. And, in allusion to a question bandied a little at their last meeting—"Did he intend to practise what he preached?" He did. The testimonials in favour of guano were very decided indeed. His own experience was decided upon it. He thought that it would be found a beneficial ingredient even in liquid manure. But he must say that he preferred using it dry, from two to three hundred weight to the acre, carefully sifted, and all the lumps broken; and, as he had already said, mixed with its bulk of moist ashes. He should propose a resolution by and bye, to the effect that the best method of improving pasture lands was first to drain off the superfluous water, then to harrow, and next to apply guano and ashes. He should now resume his seat, hoping that the observations he had offered would have the desired effect of promoting a candid discussion on the subject, and thanking the members for the very attentive and patient hearing with which they had honoured him (cheers).

Mr. Blundell conceived that much of the pasture land hereabouts required something to be done to it by way of helping it on; it was unlike some that he had seen in the midland counties, where bullocks and sheep fed upon it without its suffering any great degree of depreciation. There was no doubt that feeding off pastures with cows impoverished the land, unless, indeed, the cows received a portion of other green or oilcake. Now sheep, on the other hand, enriched the land. He contended, speaking generally, that a person who could afford to manure could afford to drain. As much of the pasture land of Hampshire had a false bottom, many of the small drain-tiles in use became choked. He recommended farmers by all means to use those with sockets. He found that tiles with collars were the cheapest things in use. Drainage with tiles, on pasture land, did even better than manure. The chief objection by landlords to tenants breaking up pasture was the abuse of the privilege by needy or grasping occupiers. But he hoped to see such lands occupied by tenants who would not abuse the bonus granted to them. Now, it was considered by Mr. Jackson and some others, that folding sheep upon pastures tended to the destruction of moss. It was very difficult to eradicate it upon gravelly, rocky, clay soil; sheep would not do it; but he belived that a plentiful supply of the best manures would go far to do it. He was inclined to agree with Mr. Jackson in regard to his notions of harrowing; he had not tried it, but he thought it likely to answer. He should recommend Howard's iron harrow; it was decidedly the best for steady and effective working. He had used it for the last two months in sowing wheat, and he could not have used a common harrow during the same season. In allusion to soap ashes, he would observe that it grew a crop of turnips which were not much larger than eggs of geese, whilst from button dust, powdered, he had a famous crop indeed. He might mention that he bottomed his farm-yard with soil every year, and he recommended its use for arable land. He could not speak experimentally of bones, but he found that Mr. Charles Palin, of Chester, in his Prize Essay, stated that he knew of land raised in value from 10s. to 40s. an acre by that application. Salt he had used in many cases, to the full extent of advice given, but with little advantage. He alluded to a case wherein sheep had been fed with oilcake, and wherein the advantage to the land was extraordinary. Wood ashes were within the command of most of them, and, as we understood him, he was preparing to use them liberally to the strongest and poorest of his pastures. In regard to the treatment of peat lands, in a meadow of his father's at Botley, in digging a well they put up a quantity of blue clay. This was thrown upon some land that had had stable manure applied to it liberally for years every other year, but the blue clay did more good than all the manure to this particular piece of land. It was the nature of the soil that required this application. Some land, peaty in its nature, opposite Stapleford field, had been covered with four inches of common gravel, and the result was a beautiful crop of Dutch clover and natural grasses. As to guano, he differed from Mr. Jackson in regard to its application. He advised it to be mixed with cottage manure, or some other heavy substance.

Mr. Spooner thought that Mr. Jackson was in error in reference to his figures as applied to the ashes of hazel. There must be a mistake. The per centage of oak was only two and a-half. Beech ashes were the most powerful, and the per centage was about three and a-half, as we understood the speaker. It was an error, evidently so upon the face of it—probably an error in the printing. The assertion was too absurd to entitle it to a minute's consideration.

Mr. Jackson, producing a thick volume written by Mr. Cuthbert Johnson, entitled "Fertilizers," said that was his authority, and pointed out the figures as he had cited them.

A desultory conversation arose on the subject, and the general impression was that it was an error.

Mr. W. C. Spooner said he would confine his observations to that branch of the subject to which his pursuits had enabled him to pay the greatest

attention, viz., the improvement of pastures by means of manures. He would pursue the order observed by the introducer, by noticing more particularly those points which he thought deserved more extended explanation. In the first place he must notice a most important error committed by the author of one of the works quoted by Mr. Jackson, in stating that the ashes of the oak contained twenty-five per cent. of the phosphate of lime, whereas seven per cent. was about the real proportion. Authors should be more cautious in making these statements, and should take care to satisfy themselves of the accuracy of their figures before they promulgated them to the public. They should not content themselves with mere compilations, which too often are but the repetitions of the incorrected errors of others. Mr. S., in allusion to the effect of top-dressing peaty land with clay and chalk, referred to the composition of peat, which, though full of organic matters, was barren, for several reasons — firstly, because these organic matters had never passed through the stages of fermentation and putrefaction, and thus were not available as food for plants; secondly, because likewise these soils were also extremely deficient in those earths which entered into the composition of plants; and thirdly, because they were full of water, which was retained like a sponge, and were deficient in that firmness and solidity so necessary for the roots of many plants. The effect of the addition of chalk and clay after the removal of the water was to improve the land mechanically and chemically, but their effect in the latter respect would be greatly assisted by the addition of manures rich in the phosphates. The nature of marl he explained, and also the cause of the difference in value between the chalk of different districts, observing that the best was obtained from chalk of the lower formation, which, besides being softer and freer from flints, was also richer in the phosphate of lime, &c. With regard to the application of sand, the best was that from the sea-shore, and which, in many instances, consisted of the fragments of shells, being, in fact, carbonate of lime in a fine state of division. Passing over several other points, as being sufficiently spoken of by preceding speakers, he proceeded to the application of artificial, or rather concentrated manures, as they should more properly be termed; for the principle on which they were applied was the same as that which obtained in medicine, and which now prevented the physician from prescribing to an ague patient large and nauseous doses of bark, as of old, as he now effected the same result by the easy administration of minute doses of the sulphate of quinine. The more bulky manures, such as dung, consisting perhaps of eighty per cent. of water, and a great portion of the remainder of rotten straw, may be compared to the bark, whilst guano and other concentrated manures, containing in a small compass all the more valuable constituents, may justly be compared to the sulphate of quinine. The excellent effects that attended the employment of large quantities of bones to pastures, in Cheshire, had not been much followed in other districts, in consequence of the great expense of £10 to £15 per acre being necessary to be incurred. It was necessary to supply it in so large a quantity because the efficacy of bones was principally *due to the* phosphates of lime, which are comparatively insoluble—that is, soluble only in water in which some acid is contained. Thus it was, by the aid of carbonic acid, which exists in most water, that the bones were gradually dissolved; and thus, by using thirty cwt. or upwards of ground bones, the surface exposed to the action of the carbonic acid was sufficient to render a limited quantity of phosphate of lime available every year. If, however, this phosphate of lime was previously rendered soluble, by being converted into a superphosphate, by means of sulphuric acid, a far less quantity, and at a very reduced expense, would answer the purpose. Mr. S. explained how it was that pastures became gradually robbed of the phosphate of lime, if grazed with milch cows or growing animals, the former removing it in the milk and the latter in their bones, whilst fatting animals, being full grown, required no addition to their bony structure, but restored again, in their evacuations, the phosphates that were taken up in the food. Thus it was, too, that the use of linseed or oilcake was so beneficial to pastures when consumed on them by fatting animals; for this cake not only abounded in the elements of fat, but was also peculiarly rich in the phosphates, which, not being required by the animal, was rejected in the dung. The value of these phosphates was illustrated by the practice of the Peruvians, who conveyed the nitrate of soda a considerable distance from the interior, where it abounded, to the coast for shipment, and loaded back with guano for their land, which they considered to possess almost miraculous powers. Now, if either soda or the elements of nitrogen, so necessary to seeds and grain of every description, were required by their land, they had a cheap and abundant supply in this nitrate of soda, the effects of which had often been found so great in this country. Their practice, however, proved that this was not the case: it was the earthy constituents, the phosphates, that were principally required, and which induced them to carry this guano such considerable distances inland—(Hear, hear.) Mr. S. explained the properties of different guanos, stating that

though Peruvian was the most valuable as abounding mostly with the salts of ammonia, it was not so well adapted for pastures as other guanos richer in the phosphates. He related the effects of various top dressings which he had used for pastures, and mentioned the very favourable results of a compost enriched with the superphosphate of lime and some ammoniacal compounds. The great effect of this dressing was corroborated by a member then present. In alluding to the use of salt, he thought its benefits had been greatly overrated, and that some of its advocates had been influenced more by its theoretical properties than by the practical results of its employment. He had used it, but without success, and he knew of parties who had destroyed or greatly injured their turnip crop by its too frequent employment. At the same time, on certain soils remote from the shore, it had been productive of much benefit, and principally as a top dressing for wheat. The speaker next explained the action of gypsum, and why it was beneficial on some soils and useless on others. The benefit must be owing not to the lime, for with that the soil abounded where gypsum was most useful, but to the other constituent, sulphuric acid, which the clovers and sainfoins required, and in which these soils were deficient. Gypsum was, however, very slightly soluble, and required a great quantity of rain to dissolve it, and should therefore be applied early in the year, so as to insure this desideratum. Mr. S. observed, in conclusion, that though the lights of science were never to be despised, yet, on the other hand, they should not be too hastily and heedlessly pursued, or like a *Will o' the Wisp*, they would often lead us astray. Theory, though of the utmost importance, should be supported by experiment before being recommended for general practice. The neglect of this precaution had already proved a stumbling block to one great name familiar to us all. Nature was a mistress that required to be carefully and tenderly wooed before she could be effectually won: the daring theorist who would carry her by storm will surely be rejected with scorn—(applause).

Mr. WOOLDRIDGE thought that, as their discussion had taken so wide a range, the resolution proposed by Mr. Jackson was not sufficiently explanatory. In the course of a short address, he mentioned a case in which a top dressing of scrapings, on a poor pasture, had had a wonderful effect. Extraordinary results, too, he knew had been produced by the late Mr. Munday, who had brought up sea-sand for a liberal top-dressing. He then instanced the great advantages of irrigation by the flooding of pastures. The neglect of farmers was proverbial, and it was daily within their observation of ditch waters running away in streams, without being made available. Flood water was the cheapest mode of improving poor pasture lands.

Mr. SPOONER said that milch cows exhausted the land, in a great degree, by taking up its constituents, such as phosphate of lime, in the milk. Linseed, for instance, restored that phosphate again to the land. Mr. Twynam's large crop of turnips was owing to the sulphate of lime returned to the land by oil-cake feeding.

Mr. JACKSON briefly replied, and moved the following resolutions:—

1. That in all poor wet pastures, draining must be considered the first step towards improvement.

2. That in the improvements of pastures, due regard should be had to regulate the basis of soils, previous to the application of manures, by casting clay upon sand and peat soils in connexion with chalk, when requisite, and by casting good loamy earth with chalk upon clay soil.

3. That we consider guano and superphosphate of lime, with a liberal admixture of wood or other ashes, cottage or other earthy manures, one of the best combinations of manures for pastures—that such applications should be preceded by harrowing, and applied early in the spring.

4. That in feeding of pastures, milch cows would depreciate them, but fatting animals would improve them, particularly when fed with an allowance of oil-cake.

Mr. BLUNDELL seconded the propositions, which were carried unanimously.

The cordial thanks of the meeting were voted to Mr. Jackson, for his excellent opening of the discussion.

It was announced that the subject for discussion, at their next monthly meeting, would be opened by Mr. Blundell, "On the Preparation of Land for the Turnip Crop."

Thanks were then heartily given to the President, for his excellent service in the chair, and the business proceedings then terminated.—Hampshire Advertiser.

CAUTION TO AGRICULTURAL IMPLEMENT MAKERS.—Several orders have been received by various manufacturers and makers of agricultural implements from certain parties in the city of Manchester, who, on inquiry, are found to have no connexion with agricultural pursuits whatever; and it has been proved that where they have obtained ploughs, dibbling-machines, and other implements, the articles have been sold by private contract, or at half price, and the seller defrauded of the amount. There is an excellent Guardian Society in Manchester; and where there is any doubt, it would be well to refer to the active and intelligent secretary thereof.

NORTON FARMERS' CLUB.

The May meeting of this club was very numerously attended. W. J. Bagshawe, Esq., presided.

It was announced by Mr. R. Booker, jun., that Miss Shore, of Meersbrook, had consented to patronise the club as an honorary member, and would contribute annually the handsome sum of one guinea to its fund. Robert Brownell, Esq., of Cliffe-field, Norton, was also unanimously elected a member.

During the ordinary preliminary business, chiefly consisting of the receipt and distribution of books belonging to the library of the club, the worthy President specially directed the attention of the members to the excellent articles on agricultural subjects contained in *The Farmers' Magazine*, of which the club purchased four copies monthly. He (the President) had read several of the late numbers with pleasure, and he had no doubt all who read them would be equally satisfied.

Labourers' Wages.

Mr. ROGERS, the Secretary, claimed the attention of the club for a short time for the purpose of referring to a stupid and mischievous report which had been industriously circulated in the neighbourhood, respecting the rate of wages which had been spoken of there by a gentleman of the club. It was stated in the village (and considerable credence was given to the report by respectable labourers) that the Rev. Mr. Fenton, in his paper on farm servants, in January last, had said that from seven to nine shillings per week was sufficient wage for a labouring man. Now he (the Secretary) was present when the paper in question was read, and he could positively assert that no such declaration as that imputed to the reverend gentleman was ever made in that room. A report of Mr. Fenton's paper, and the remarks that followed, appeared in *The Independent;* and he submitted that it did not contain one single sentence to justify or warrant the incorrect statement which had been so industriously circulated. He was glad the Rev. Mr. Fenton was then present, and he hoped he would excuse him for bringing the matter forward. He did it from a sense of duty; because if such mischievous reports were suffered to go uncontradicted, they might prejudice the interests of the club.

The PRESIDENT said no such opinion about low wages was ever given in his presence. He would read the following extract from Mr. Fenton's paper; and he hoped it would be again printed for the satisfaction of those who took an interest in the matter:—

"Our attention will naturally be directed first to the subject of wages and food. The wages are generally regulated by the custom of the neighbourhood; but no custom can be pleaded as an excuse for that miserably low scale of payment which prevails in some of the southern counties. With neither rents nor rates to be complained of; with land well repaying the outlay upon it, the farmers there are in the habit of giving wages barely sufficient to keep a family from starving. Happily, in this neighbourhood there is a very different spirit. The rate of payment here may be called liberal. The average seems to be somewhat as follows:—For a boy in a house, £6 a-year; for a man, £13; for an out-labourer, 8s. 6d. a-week, *with meals;* 13s. 6d. without. In some cases more than these sums are paid, in others rather less; though it is difficult to see how a family can be supported in anything like comfort for less."

The President remarked that there was nothing in the above to warrant the report which had gone forth. He thought there was no man in that neighbourhood who would disgrace himself by offering the same low wages as paid in the south of England.

The Rev. Mr. FENTON thanked the Secretary for bringing the matter before the club. He had heard of the report in question from several quarters; but he could not conceive how such a misapprehension of his remarks had arisen. So far (said the Reverend gentleman with much emphasis) from wishing to pull down wages, I should be glad if farmers could afford to pay more than they do (Hear, hear).

The PRESIDENT said that the paper, though plain and comprehensive, had not been understood by some of the labourers. Their reading was entirely a misconception of its true meaning. Mr. Fenton had, in fact, merely recited the customs prevalent, without giving his own opinion of what wages ought to be at all. One of the customs was stated to be—"For an out-labourer, 8s. 6d. a-week, *with meals;* 13s. 6d. without."

After a few brief remarks from Mr. R. Booker and other members, an opinion of unanimity prevailed that not the slightest cause had been given by any member of the club for the report alluded to, and the subject dropped.

Turnip Cultivation.

It had been arranged for Mr. Bingley to give a paper on the cultivation of the turnip this evening;

but during the afternoon a note was received by the Secretary from that gentleman, stating his inability to attend.

The PRESIDENT, in order that many who had attended to hear the question entertained might not go away disappointed, read two excellent reports on the subject from *The Farmers' Magazine*. One was from the pen of an eminent farmer in the East Riding. Of course the soil and strata of Norton differed materially from those of the former district of country; but still the prevalent customs in regard to sowing, nature of seed, tillages, &c., bore considerable affinity to each other. In the East Riding the average yield was said to be about twenty tons of bulbs to the acre. In some cases as many as forty tons were stated to have been produced last year. The President added—I'm afraid we cannot come that here. Of many experiments tried with tillages, none were found to answer so well as *genuine* guano. The time of sowing swedes was recommended to be not later than the 12th of May. From 1½ to 3 lbs. of seed per acre was used; but the average quantity of 2 lbs. was thought the most desirable. It was affirmed that every vegetable is the best raised on clay soils. In the north of England they can grow turnips better than in the south; so in the south they can beat us in the production of wheat. After some discussion as to the best state of soils for receiving turnip seed, it was agreed that soils with loose bottoms were the most approved; and the President added, it is the best for all crops.

Mr. Green; Mr. R. Booker, jun.; Mr. Robert Linley; Mr. Hodgkinson; Mr. J. Bradbury; Mr. George Osborne; and others, severally gave opinions on this and other subjects; and a long conversation then ensued as to the draining tiles best adapted to that district. A sample, and plates of tiles manufactured by Mr. Osborne, of a very superior clay, were exhibited to the members, and engrossed a good deal of attention. The tiles are manufactured by an improved or patented machine, and stated to be capable of resisting decay for any length of time.

Pleuro-pneumonia (the disease in cattle) also received its share of notice by the club. The disease was stated to be fearfully on the increase in the neighbourhood of Sheffield, and that serious losses were daily sustained.

Mr. S. LOUKES said, in nineteen cases out of twenty, where cattle were sent by railway, the animals were found to be affected by the disease soon after arrival, however free from the distemper they might be at starting. This he attributed to want of sanatory regulations in the railway carriages, which often conveyed diseased cattle, and received others without being fumigated or cleaned.

The PRESIDENT said, the facts stated by Mr. Loukes were undoubtedly true; and he trusted some attention would be paid to the evil by railway companies. He (the President) did not think that the importation of foreign cattle had more than made up for those lost in this country by disease.

The last, though perhaps not the least important information given during the evening, was by Mr. R. BOOKER, jun., who informed the members that he had that day become the purchaser of a very superior animal, the sire of which was the celebrated bull, the property of W. Newbould, Esq., of the Intake, than whom a gentleman more distinguished for his breed of the kind did not exist in that neighbourhood. He thus hoped to receive the thanks and patronage of his neighbours for his spirited speculation. He had bought the animal of their worthy President, which he conceived to be a sufficient recommendation; and in honour of one of the greatest benefactors to his country, he should name him "Cobden" (loud laughter and cheers).

The PRESIDENT (good humouredly): That is a name I did not give him, I am very sure (laughter).

The next meeting was announced for the 5th of June.

YORK FARMERS' CLUB.

In the absence of the Chairman and Vice-chairman, the SECRETARY presided; and he commenced the proceedings by stating that since the last general meeting a committee meeting had been held, at which it was resolved that, with a view to bring the club in more immediate communication with the Royal Agricultural Society, he (the Secretary) should become a member of that society. In pursuance of that resolution, he had remitted the subscription of £1, and had in reply received a communication from Mr. Hudson, the secretary, stating that in future all matters of interest to the club would be punctually transmitted.

DISCUSSION ON THE PREPARATION OF THE LAND FOR TURNIPS.

Mr. THOMAS HOWARD commenced a discussion upon this subject, which had previously been fixed for to-day's meeting, by reading the following notes:—Having been successful in obtaining good crops of turnips on land that was considered very unsuitable for them, I was willing to comply with the request that I should make some observa-

tions on the subject; and I wish I may be able to perform the task satisfactorily. My remarks will be merely practical, and refer more particularly to strong unkindly soil, leaving it to others to add their own scientific illustrations. To begin, then, at the beginning: As soon as ever the corn crop is off the ground, without losing a single half-day, let the stubble be broad-shared, or pared off with a paring plough or the scuffler, or with Ducie's drag, taking only about a couple of inches of soil with it. Let it be harrowed and raked, and the rubbish either burnt on the land or carted off. Let it then be ploughed five or six inches deep, harrowed, dragged, harrowed, raked, and cleaned; and let all this be done with the greatest possible expedition, in dry weather, immediately after harvest, when we commonly have a continuation of the hot, dry season. The land may then be ploughed two furrows deep; and in this state it should remain untouched until spring. It may be needful to observe that the subsoil furrows should be shallow, so as not to bring up too much raw earth. In the spring the land may be deeply dragged and well harrowed, and the quicks gathered, if any remain; but ploughing should be avoided, except for the purpose of forming one bout-ridge of 27 inches in width. It should then be manured in the furrows with 10 or 15 tons of short, but not rotten, manure per acre. This is a straightforward way of proceeding, differing but little from the present practice of a few farmers, but essentially different from the method commonly pursued—namely, that of leaving the cleaning of the land until spring, and ploughing it several times during the summer in which the turnips are sown. These remarks, it must be remembered, refer chiefly to unkindly land; and a principal cause of its being so is its wetness, and being trodden and ploughed when wet. When such land is thoroughly drained and subsoiled, its stubbornness is in a great measure removed. It is therefore needful to say a few words on the very important subject of drainage; for without that it is folly to attempt the cultivation of turnips on such land. It is by no means enough merely to drain the surface, which is all that many farmers aim at: it is the subsoil which more particularly requires to be drained. As the butcher's boy has often proved the truth of Hudibras's remark, that if you spur one side on, the other wo'nt lag behind, so experience proves that if you make the subsoil dry, the top soil will not remain wet. If we would make a successful cure, we must go to the root of the disease—we must both drain deep and cultivate deep. By these means the temperature of the land is greatly improved: it will not only be drier, but it will be warmer also; neither will it be parched so much with drought as it used to be. Much land that is said to be drained is done so in such a very imperfect way as to require draining over again, with deeper drains crossing the old ones; nor will the drainage be complete until the pan has been broken up, and the subsoil loosened and cultivated also. In addition to this, on strong land (though not on light soil) it is very desirable to burn large quantities of earth with brushwood and roots, the earth to be burnt black more than red, and the wood to charcoal rather than white ashes. A part of this burnt earth may be worked into the soil, and the rest, if perfectly cool, spread upon the manure as soon as it is righted in the open ridge, or it may be drilled in with the seed. With plenty of thorns, brushwood, dry peat, or a little coal to burn with earth, and by carefully saving every drop of liquid manure to mix with the dry ashes, an unlimited quantity of good turnip manure may be raised, especially if a small quantity of salt and saltpetre, soot, bones, guano, or other manure be added to the mixture. By such means wet, unkindly, summer-fallow land has been converted into tolerably dry, kindly soil, capable of growing good crops of turnips, barley, and clover, though not suitable for eating turnips on the land, except in very dry weather. A similar practice will be found to answer for turnips on light land, except the burning, which on such land is very objectionable, unless it be sward. On light land, it is best to gather the quicks and use them for litter, or to rot them in heaps with liquid manure, or lime and salt. On dry, light land, where the turnips are to be eaten on, they may be sown with narrower intervals, on the level, and with drill manure only. Another plan, of which I have a good opinion, but in which I have had no personal experience, is to clean ridge and manure the land, and make it completely ready in the autumn for sowing with swedes in the early part of May. In this case the manure should be as new as it can be, to be so short as not to be dragged by the drill. Indeed, for strong land generally, the manure should be fresh, so as to ferment in the ground, and not in the midden. With this view, all the straw should be chopped for litter, and all living seeds and growing weeds carefully excluded. This fermentation of the manure in the ground is very desirable in strong land, to which it gives a degree of warmth and lightness. But on light land it is, perhaps, better to have the "muck" slightly fermented in the midden; or, at least, avoided in strong land. In all cases stimulating manure well trodden down in the furrow, which should be drilled in (but not in close contact with the seed), to force the young plants quickly into rough leaf, when, barring grubs and grub-hunters, your crop is safe. This early vigour

is one of the principal objects to be aimed at; but as the crop should be eaten off strong land (though in dry frosty weather only); and as the following course of crops is dependent on the preparation of the land for the turnips, it is both needful and profitable to manure with farm-yard manure also. In fact, wherever turnips are grown, it is good policy to manure liberally and cultivate highly, scuffling and hoeing repeatedly and early, for the encouragement of that most important crop, a part, at least, of which may in all cases, with such high cultivation, be consumed at the farm-yard. As in other concerns, so particularly in this, "the liberal man deviseth liberal things; and by liberal things he shall stand." It is upon the high, clean, perfect, gardenlike cultivation of the turnip or other green crop that the success of the whole farm mainly depends. The other crops, the stock, and the muck-midden are all dependent upon this: it is, therefore, desirable to spare no reasonable expense in attaining so important an object, even though the turnip crop alone should not pay for it. If it be unprofitable, it will probably be less so than a bare fallow. Sincerely wishing that every landlord may encourage every tenant to act thus liberally, and that, in doing so, he may reap double produce as the reward of his merit, I will conclude by begging you to excuse this ill-dressed statement, to blow away the chaff, and after gathering up the few grains that remain, to analyze them, and every particle of the crop and the soil and manure with which it is raised. And thus, by analyzing practice, and uniting science with it, I hope and trust your laudable efforts to improve the agriculture of the country will be crowned with abundant success. A similar cultivation to what I have described will answer for turnips on light land, and for rape, mangold wurzel, cabbages, or carrots, and parsnips, the two last having two or three rows on a wider, flat-topped ridge. I also strongly recommend the one-bout ridge system for alternate ridges of beans and turnips, or other cattle crops; or two ridges of turnips between two of beans. And I have found it beneficial to dibble in a few mangold wurzel seeds in the ridge with carrots, parsnips, or swedes. Some object to these mixed crops; but I have found them to be the safest and most productive, especially on strong land. Superphosphate of lime is said to be a preventive of the ravages of the fly. I am also satisfied that high cultivation and thick sowing, either very early or late, with the frequent use of the scuffler between the first appearance of the plants and their getting into rough leaf, tend much to overcome the turnip's great enemy. As a healthy, well-fed animal will survive an attack which would kill an ill-fed, puny one, so it is with the turnip plant. To these desultory notes I will just add that the cultivation of turnips on light and on strong soils should in many respects be different. On light land, the ridges or the flat spans between the rows may be narrower than on strong land. Light land may be rolled and worked very fine, which should be avoided on strong land, or, at least, until very near the time of sowing. I hope you will not think me impertinent if I congratulate the members of the York Farmers' Club on their practice of spending an hour or two in the rational explanation of their practices and opinions with reference to the important subject of farming. In calmly discussing these matters, they are surely employing the time far more rationally and usefully than by smoking and drinking at the public house. If they will carefully investigate the subject, they will probably be convinced that, so far from intemperance being beneficial to agriculture, as some short-sighted observers think, it is one of the greatest barriers to its advancement, and one of its most injurious adversaries. A conviction that there is commonly much misapprehension on this subject has induced me to take the liberty of dropping this hint, which your good sense will cause you to receive with the same good feeling as it is expressed (applause).

A long and very interesting discussion ensued, in the course of which a variety of questions were raised—namely, "What is the best kind of turnip?" "What is the best mode of taking the seed?" "What are the best manures?" and "What is the best plan of preparing the land?" In reply to these several questions, the bottle or tankard turnip was, in the first place, highly spoken of. Secondly, it was urged that the seed should be taken from untransplanted plants, inasmuch as the practice of transplanting weakens the seed. Thirdly, that dissolved bones were the best manure. And fourthly, that farmers should commence preparing the land for the turnip crop as early after the harvest as possible. On the question of manures, the Secretary entered into a statistical statement, showing that bones dissolved in sulphuric acid contain all the constituent parts of the turnip, alluded to in Mr. Howard's notes; that, consequently, they were peculiarly adapted to that crop as a manure; and that, although bones heaped up with wet sand or ashes will dissolve themselves, yet, when applied to the crop, there is no comparison in their effects as compared with bones dissolved in sulphuric acid. The mode of preparing the land, however, was the question more immediately before the meeting; and it was resolved that "This meeting recommends land intended for the cultivation of the turnip crop should be well scarified as speedily as possible

after harvest, and ploughed previous to or during winter."

The meeting terminated with votes of thanks to Mr. White and Mr. Howard—to the former as chairman, and the latter for the useful hints which had been discussed.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR MAY.

During the greater portion of this month the weather, though somewhat less humid than could have been desired for spring corn, has proved seasonably fine and vegetative. Notwithstanding the unusually late period at which the whole of the seed was got in, arising from the almost continuous rains, and the saturated condition of the soil—to which we particularly alluded in our last—the accounts which have lately come to hand from our large agricultural districts are tolerably favourable. The only reasonable fault that can be found is in respect to the barleys, which did not "chit" well; consequently, in some instances, the soil upon which a portion of that grain was sown has been resown with other crops. It is, we find, considered by not a few persons that the cutting of wheat, barley, and oats will be commenced this year later than in the ordinary run of seasons; but we see nothing in the present appearance of the fields to warrant such a conclusion, although in the north the plants are not quite so forward as we have noticed them at some corresponding periods.

From inquiries instituted in most parts of the kingdom, it is quite evident that the stocks of wheat in the hands of our agriculturists are still extensive. This important fact, coupled with the steady imports from abroad, make it evident that there is very little prospect of any important rise in the value of that grain during the present year, unless, indeed, home produce should turn out deficient, and the warlike movements abroad should impede the arrivals. The quantity of barley on hand is certainly above an average, both as respects quantity and quality; but that of oats, beans, and peas is unquestionably small. That the breadth of land under grain culture is large, not a doubt can be expressed by those who have had ample opportunities for inquiry.

We regret to state that the epidemic has committed serious ravages amongst the stock in the course of the month. In many instances, it has been found impossible to forward the beasts to market; hence, they have been sold to local butchers, at a considerable sacrifice. One of our correspondents informs us, that out of 100 beasts fed in his stalls, 70 have been seriously affected, out of which 24 have died. The foot-rot in sheep has not been very disastrous in its effects; while the lambing season has turned out remarkably well, with very few losses of consequence.

The quantity of land planted with potatoes is considerably in excess of that of last year. Up to the present time, very few indications of disease have presented themselves, and the sets are looking remarkably healthy. In Ireland, great attention appears to have been given to potato culture this season. Although the supplies forwarded to the various markets have been tolerably extensive, prices have considerably advanced; the best qualities having sold as high as 200s. per ton. Upwards of 2,500 tons have arrived in London from the continent—mostly from Antwerp—in fair condition, and which have sold at prices varying from 80s. to 110s. per ton.

In all quarters, pasture herbage is very abundant. This, together with the large supplies of hay left over from last year, has caused the stock to fare exceedingly well. The show for fruit in most parts of England is very good.

Our letters from Ireland and Scotland are somewhat favourable. The crops are represented as making good progress; but the shipments of grain to England have been small.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Although complaints have reached us from some parts of the country to the effect that the quantity of stock, both beasts and sheep, in the stalls and pastures, is small compared with the consumption, the various markets have been much better supplied during the past month than for some time previously; hence the general demand, owing in a great measure to the increasing arrivals from abroad as well as from Scotland, has been far from active. In Smithfield, beef has declined in value quite 4d., and veal from 2d. to 4d. per 8lbs. Mutton and lamb have, however, moved off steadily, at full rates of currency, and at which good clearances have been effected. A decided increase has taken lace in the imports of foreign stock, as will be seen by the following statement:—

IMPORTS INTO LONDON.

	Head.
Beasts	2,197
Sheep	4,781
Lambs	28
Calves	898
Total	7,904
Same month last year	6,275

At the outports about 3,500 head of each kind of stock have been landed, chiefly from Holland; but only two oxen have arrived at Southampton from Spain.

The supplies of fat stock on offer in Smithfield have been as under:—

	Head.
Beasts	16,541
Cows	491
Sheep and lambs	102,230
Calves	2,087
Pigs	2,581

CORRESPONDING PERIODS.

	May. 1845.	May. 1846.	May. 1847.
	Head.	Head.	Head.
Beasts	14,117	14,287	17,175
Cows	520	541	601
Sheep and lambs	130,930	123,970	109,670
Calves	1,436	1,267	1,727
Pigs	2,501	2,380	2,816

The bullock supplies exhibited in the course of the month have been chiefly drawn from the following quarters:—

	Head.
Eastern counties	5,900
Northern, western, and midland ditto	3,400
Other parts of England	2,100
Scotland	2,560

COMPARISON OF PRICES.

Per 8lbs. to sink the offals.

	May, 1846.		May, 1847.	
	s. d.	s. d.	s. d.	s. d.
Beef, from	3 0 to	4 2 ..	4 2 to	5 6
Mutton ..	4 0	5 2 ..	5 0	6 4
Lamb	5 8	6 10 ..	6 0	7 0
Veal	3 10	4 10 ..	4 4	5 4
Pork	4 0	5 0 ..	4 2	5 4

	May, 1846.		May, 1845.	
	s. d.	s. d.	s. d.	s. d.
Beef, from	2 6 to	4 0 ..	3 0 to	4 6
Mutton ..	3 4	4 4 ..	3 4	5 0
Lamb	5 0	6 0 ..	4 10	6 0
Veal ...	3 10	5 0 ..	4 0	5 2
Pork	3 8	5 0 ..	3 0	4 2

The principal feature in the above comparison is the fact that, notwithstanding the supplies of beasts and sheep on offer have fallen short of those at the same time last year, the prices of those descriptions of stock are lower by nearly 30 per cent. than at that period.

Up to Newgate and Leadenhall markets the arrivals of slaughtered meat have been on a very moderate scale. On the whole the trade has ruled steady, without material alteration in the quotations.

GLOUCESTERSHIRE.

The last time we had occasion to pen our humble observations upon this county, the tenor of our report was far from encouraging. The heavy and excessive fall of rain in April and March, super-saturating the lands, had its deleterious effects, not only in imparting a temporary evil to the standing crops, but in proving a most gigantic and serious impediment to the farmer in preventing him from preparing and tilling the land. The wheat upon the heavy, wet lands bore a sickly, yellow, and drooping aspect, and had the excessive floods continued without the advent of that benign meteorological change, resulting in such happy effects, there would evidently have existed the most ample cause for the apprehension of the most serious alarm. Our task is now more pleasant and gratifying, both to ourselves and to those whom we have the honour of addressing; for an entire beneficial change has since been assumed in the whole feature of things. The wheat, with a paucity of insignificant exceptions, bears symptoms of the most flattering promises. The beans look remarkably well and healthy, being generally covered with the most luxuriant and prolific blossom ever preceded in the memory of man. We do not, however, think that planting has been upon so extensive an area as of previous years, from the surfeit and discouragement which have been evinced from consecutive failures of the crops, involving the farmer in the most serious losses. The potatoes look remarkably promising and precocious, though some Cerberus of an alarmist has vainly essayed to assert that an incipient stage of the quondam disease is rapidly developing itself. All classes seem to have resumed their fostered confidence in the potato, and have planted it as extensively as in any year prior to the advent of the disease. The barley looks tolerably well, but on the whole, of course, backward; and we apprehend that, from the contravention of physical obstacles, barley-planting has not been upon an over-average, but, on the contrary, below the zero of an average scale. The harvest of that, however, which has been planted, from an identity of causes, with the felicitous intervention of the most favourable weather, must consequently be protracted beyond the usual assignable date. The fruit-trees still continue to bear the favourable impress of promise, in Gloucestershire, Herefordshire, and Worcestershire. From the late abundance of moisture, our pastures have an abundance of grass, which, in most districts, will be soon fit for the scythe. There appears to be abundance of vetches and green stuffs, which has a great effect upon the consumption of oats, &c. We regret to affirm that to-day there has been a continual fall of blight from the north-east, a continuance of which, of any duration, or at intervals, cannot possibly fail to produce the most deleterious effects upon vegetation in general. We have examined several of the flies which have fallen upon corollas of flowers, with the aid of a solar microscope, and discover that they bear proximate analogy to those *curculionæ*-looking pests which so afflicted the bean, in blossom and in pod, last year. The advent of these predatory hordes of winged barbarians, more odious to the farmer than the leviathan dragons of fairy lore, must be hailed most inauspiciously, for, should they continue their phantasmal migrations from the land of cupolas, deserts, sands, and pyramids, in so formidable a phalanx upon the pestiferous car of the wind, they will raise an incubus that will tend to

the destruction or serious injury of the bean crop, reviewing it in its present critical position. For the last few days we have been visited by occasional showers, which have not permeated the earth so as to be much felt. The writer has passed through some considerable portion of the counties of Herefordshire and Worcestershire during the past week, and everything bears the most favourable aspect. From casual inquiries, made from a host of miscellaneous authorities, it would appear that the stocks in the hands of the farmers are not extraordinary, placed collaterally with those of years which could be adduced. From the *coup-d'œil* we could take from the saddle of our *Pegasus*, potato-planting, even at this advanced period, would appear to be upon a very extensive scale in Herefordshire.—E. L.

EDINBURGHSHIRE.

At the time of writing our last report the weather was not considered very favourable, and fears were entertained that the cold, frost, and wetness then experienced would prove hurtful to the crops, but fine weather was soon thereafter vouchsafed to us, which continuing up to the present time has greatly improved the aspect of the crops, and enabled the farmer to proceed with the important field operations at this season. The wheats which in some instances assumed a rather unhealthy appearance, now looks generally well, spring as well as autumn sown, and gives promise of a fair crop. Barley and oats are also a fine braird; the latter is particularly marked for its superiority, and especially in the upland districts. Beans are likewise looking well, but they are not far advanced. Potatoes are still being planted, and those first put in are pointing above the ground, evidently strong and healthy; but it is, as yet, too soon to say much about what may be the result. The demand for seed has been great, and latterly the supply of certain kinds has been too small for the demand, and the price rose from 180s. to 210s. per ton. Preparing the land for turnips now engrosses the most attention, and with fine dry weather every exertion should be made to prepare and clear the land properly, as nothing contributes more to ensure a crop of turnips than a well-prepared soil. A good many swedes have already been put in, indeed the greater part is already sown of this variety; some yellows are also put in, but it is yet rather early. The young grasses are highly promising. The grain markets have been sparingly supplied by the farmers, and the receipts from abroad and coastwise have been likewise small; yet, such is the apathy to buy more than is absolutely necessary for immediate wants, that prices must be written fully lower for wheat, and only a trifle higher for spring corn within the last four weeks. The fine weather must have a depressing influence on the value of grain. Cattle markets have been more largely supplied with sheep and cattle, and as we have all along predicted, prices have given way considerably for the last two weeks; the fall on sheep has been 4s. 6d. to 6s. a head, and on cattle proportionately great. Prices are still high, and we doubt if they will get much lower now, at least should the season prove favourable for pastures. The public sales of stock in the locality, have been well attended, and very high prices have been paid for all descriptions of live stock, when free of *pleuro-pneumonia*.—May 23.

CALENDAR OF HORTICULTURE.—JUNE.

The retrospect is deferred till we ascertain the results of the present gorgeous weather, which (this 18th May included) has comprised twenty consecutive days of brilliant sunshine, attended with a regular maximum temperature of unwonted power, seldom under 70 deg., very frequently equal to that of Midsummer. A change of wind indicates disturbance.

Operations in the Vegetable Garden.

Peas.—Few have success with peas sown after May; but "Knight's tall marrow," and even the "blue imperial," can be made to prosper. Not a day, however, must be lost; and presuming that the ground will be dry, the following processes are recommended. Choose a bold plot of ground where the rows shall never stand nearer than five to six feet from each other, and pointing north and south; it will be all the better if it already contain an ample supply of old manure from some previous crop, as of celery for instance. Mark out as many two-feet-wide trenches as there are projected rows; then trench-dig a space to the depth of 20 inches, throwing the earth on each side of the trench; manure the bottom three inches, and fork-dig it to incorporate the subsoil with the dung; old vegetable refuse, with a sprinkling of salt and lime-screenings, will do nearly as well; water the whole to saturation, then return gradually the soil raised from the trench, and add some shovels of perfectly rotted manure to every six inches of the pulverized earth. Do this three times, giving a copious supply of water to each addition, till all but about three inches of the soil remain, which leave without fresh manure or water. In a day or two sow the seeds one by one in an accurately made drill about three inches deep, and previously watered; add furze, chopped fine, if mice threaten; cover carefully with the finest earth, pat it down, and lay an inch of old saw-dust or decayed furze leaves over the same; finish with two lines of shoemaker's twine stretched upon six-inch-high sticks along the course of the drills, to warn off birds. By this effectual preparation of a bed and single rows, peas may be had till October without waterings, and perhaps entirely free from mildew. The last sowings of French beans and scarlet or variegated runners may thus be made in June, with almost a certainty of success; these runners, however, should be dwarfed, and kept back to two feet by reiterated nipping-back.

Cucumbers, heretofore under hand-glasses tilted, or in frames over ridges, must be permitted to run,

the advancing shoots pegged down in regular form, and kept stopped at the showing fruit; put out a few reserved plants, and also of *vegetable marrow*, upon a hill or ridge over manure.

Sow salading, lettuces, radish, spinage—weekly or as wanted—at any time of the month, endive in the second week, and more towards the end for the chief supply. Sow small hearting cabbage for latter summer and autumn, purple cape broccoli, turnips in the first week and again at the end; carrots and onions for drawing young. Hoe beet, parsnips, carrots, leeks; prick out and water the best plants of curled parsley—distance is essential between each. Stick peas, and stop them; also later broad beans. Destroy weeds whenever seen. Cease to cut asparagus about the 21st; then weed the surface.

Hardy Fruit Trees.

Grafts.—Look over the trees to relieve the ties if too binding, or to apply fresh ones if those now on are broken and insufficient. It frequently happens that by the binding of a scion the newly-deposited matter is forced out, and produces complete granular deformity.

Complete the process of disbudding, and then fasten in order the reserved shoots of wall-trees.

At the end of the month begin to break or prune back the breast-wood of spur-bearing trees. Thin out apricots and supernumerary peaches, &c., &c. Look over the vines, stop the lead of the bearers, cut off tendrils, and fasten the shoots; the green prunings, tendrils, &c., make excellent *grape wine*; or if not so employed, they serve to self-manure the soil.

Strawberries, in bloom and fruiting, must have abundance of soft water, if they really want it and flag; should there be no timely showers, we fear the late tropical climate and fierce sunbeams will have reduced the promised bulk of crop. The questions of *watering*, and of constantly cutting or tearing off the advancing runner-strings, are ably stated in the *Gardener's Chronicle* of May 20th. I lean to the opinion that the runners do *no* harm, and certainly *the first* plantlets produce the best stock. Watering sometimes preserves the plants, but as to fruit I never had it better or earlier than after one dry spring wherein I gave none. Copiously water all the trees planted since last summer; it is astonishing how speedily the moisture of land passes off at this time of year, however rainy the previous season may have been.

The *Early Vinery.*—All the fruit is already, or very speedily will be, cut; air, therefore, should then be freely admitted—not, however, by removing the roof-sashes, as by so doing the foliage would be injured by sun; on the contrary, it ought to be protected, so that its every function may be completed. A lively current passing from the floor to, and through, ventilators at the upper part of the house would be very useful, and so would be access of a gentle shower in gloomy weather, at which time an exposure of the leaves might be beneficial.

Mildew on peach leaves is removed by dredging with sulphur; tobacco infusion syringed forcibly in the curled leaves will be offensive to the green or black aphis. I have thought that a strong decoction of quassia shavings was a safe and useful application, but my experience is not as yet conclusive.

Do our gardening friends know, by their own experience, that *the grub of the cockchafer eats through strawberry plants*, just at the collar, causing the plants to decay and wither in a few hours? A garden here was made, in 1846, on the site of a meadow, the soil a deep black mould, resting upon gravel. In such places the eggs of this insect are deposited in May and June; the larvæ remain four years in the earth, and work their way upward season after season, till, in the third year, they reach the roots of some plants. At the middle of May, for two seasons, these pests have preyed upon some of my "British Queens," planted in 1847. I have *invariably detected* them very near the root of a flaccid plant by carefully using the hand-fork; this fact is worthy of notice.

In the Forcing Fruit Department

Shift pines into rich turfy loam, or in couch-grass earth mixed with fibrous heath-mould; keep up much moisture, and in every way urge on the growth of successional plants; remove suckers. Keep up a supply of kidney-beans and of cucumbers in pots; also of melons in the frames, sprinkling over the leaves before closing for the night. Melon plants appear to produce most fruit when the main shoots are permitted, after the first stopping (which produces the system of laterals), to run on to nearly the boundaries of the pit or frame before the leaders are pinched off; the secondary laterals then become so strong as to support the fruit, and bring it to perfection. The Persian melons have the finest flavour beyond comparison.

The colouring of grapes is of some consequence, and of this and its peculiar uncertainties abundance of contradictory opinions are broached. Air duly admitted and the full *un*-refracted beams of the sun are the causes of colour; but we treat vines artificially, and their fruit *must* be protected; hence, as light and the modifying influences of glass, are variable, we must compound for trifles, and, after all, there is but little to complain of; shanking and shrivelling are far greater deformities, and these can only be averted by balancing the absorbing powers and fertility of the trees with the healthy nutriment-

supplying temperament and quality of the soil; it is mere quackery to prescribe remedies for local and unknown causes of disease.

Flower Department.

The parterres and miscellaneous borders require the chief attention. Taste must decide as to selection of plants; but as to preparation of the ground, so long as any " bedding out" remains to be done, we must insist upon *fresh soil.* Every person with means at command ought to have a constant supply at hand of rich mellow turfy loam, not binding, but unctuous, and rather inclining to sandy; the parterre old soil should be taken out more than spit deep, and transferred to the shrubberies, kitchen-garden, or compost ground, to make way for entirely new loam, or loam and old manure, loam and three parts reduced leaves, heath soil, leaf mould, &c., as the case may be, in deference to the peculiar claim of each individual that is to occupy its peculiar bed. They who cannot so avail themselves must yearly bring up some of the subsoil, and interblend it with garden soil, &c., from other departments. Fresh earth is the first principle of superior floriculture, as the really observing gardener cannot fail to discover.

Roses.—The " Perpetuals," " Noisettes," and other favourites demand great care. Some have already sustained an onslaught of the green fly; the beetle-grub is also far from idle; a quick eye and ready hand are called for.

Mow lawns discreetly in very dry weather, for the scythe is but too likely to be followed by a parched appearance. Cut off, or rather exterminate daisies. Leave box edgings alone till the end of summer. Water (*copiously* when done, rather than often) evergreen shrubs, and all those recently planted. An experiment made last autumn with young seedling hollies has proved that they can *then* be removed with perfect success.

Retrospect.—After a perfect blaze of sun during twenty days, the wind changed, and produced thunder showers and soft rain at several places. At and about Croydon the former were scarcely perceptible and the latter trifling in amount, so that the surface remains dry, and exposes many cracks. Vegetables, however, have been extremely fine, and the supply most abundant. Fruit is uncertain, though in some places apricots have set remarkably well; cherries, in Kent, we hear are fine, and likely to yield profusely. Ornamental plants are early, and so abundant and cheap that any one can obtain them; they are seen everywhere.

Of potatoes, the supply of the *old* proves the falsity of the reports that were so widely propagated last year; now, the crop in the ground is doubled, and if, as all anticipate, the disease has departed, the public may look for an early and cheap supply.

Croydon, May 22.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

ASHBOURN FAIR.—There was a limited supply of stock of all descriptions; and for horned cattle, a slight decline under former rates was submitted to.

BEDALE FORTNIGHT FAIR.—We had only a short supply of cattle. Fat beasts sold up readily at last fortnight's prices; young beasts were not much looked at. The show of sheep was rather thin, and met with a good attendance at previous quotations. Beef, 6s. 6d. to 7s. per st.: Mutton, 6¼d. to 7d. per lb.

COLDSTREAM MONTHLY MARKET was, as usual, well supplied with first-rate stock. Prices were, however, on the decline, and by no means supported former quotations. Though sales were, upon the whole, somewhat brisk, beef cannot be stated as averaging more than from 5s. 9d. to 6s. 3d. per stone, and mutton in wool from 6¼d. to 6½d. per lb., sinking all offals. Clipped sheep, of which a great number were in market, averaged in general from 5½d. to 6¼d. per lb. The cow market was but indifferently supplied, there being none, with two exceptions, fit for the Edinburgh market, and which averaged from £12 to £14. A few Ayrshire cows sold slowly at from £10 to £13.

DRIFFIELD FORTNIGHT MARKET. — An average supply of beasts and sheep, which met with rather dull sale, although the greater part of the stock was sold. Beef, 7s. per stone; Mutton, 5½d. to 6½d. per lb.

DUNSTABLE FAIR.—There was a much worse show in the cow fair than we have witnessed on this fair-day for some years past. Trade for useful beasts was very brisk, at good prices, while those of an inferior description were difficult to dispose of. About an average number of sheep were penned, which were disposed of, at prices quite equal to the markets and fairs held in this neighbourhood lately, and nearly everything sold.

GISBURNE FAIR —We had a very short supply of fat, which caused a dear market. Also a very few present calvers, which sold at 20s. to 30s. per head higher than last fair. We had not so many lean stock by 1,000 head as last fair, which caused them to be better sold.

GREENLAW FAIR.—There was a show of cattle far beyond those of the two preceding years. There was a considerable diversity of prices, varying according to the different kinds of breed and condition. Best country cows averaged rom £9 to £14; home-bred two years old from £9 to £12 15s.; year olds from £5 10s. to £6 15s. Mr. Stark, a celebrated breeder here, sold a quey 22 months old at £20, and refused £19 for another of the same kind and age.

HAWICK FAIR. — There was more stock shown than formerly, chiefly milch cows and yearling cattle. The demand for the best descriptions was good, at fair remunerating prices. Stirks were going off readily, at from £5 to £6 6s., and some better lots up to £7 10s. Milch cows from £12 to £14 10s.; best, £16 to £17; inferior at all prices from £6 to £10.

KELSO MONTHLY MARKET.—Seldom have we witnessed so large and excellent a show of cattle. Most of the fat was of first-rate quality, but the demand was dull, and prices were from 6d. to 7d. per stone down from the last monthly market. The current prices ranged from 5s. 6d. to 6s. per stone, but in a few instances 6s. 3d. and even 6s. 6d. was obtained for heifers of very fine quality. Grazing cattle

met also with a dull sale, and at a reduction in price from recent markets. The market was well supplied with cows, but the great majority were of an inferior description. Sales were difficult to make, and a number were driven away unsold. Prices for country cows varied from £7 to £11, and those that were suitable for the Edinburgh market brought from £12 to £16. The supply of sheep was large, and the show of clipped hogs superior to that of any market in the month of May since the feeding of this description of stock was introduced. Most of the hogs were disposed of, but the bulk of the rough sheep were left unsold. Clipped mutton brought from 5½d. to 6d. per lb.

KENDAL FORTNIGHT FAIR.—There was an average supply of cattle and sheep, but the sales were few and prices generally on the decline.

LEEDS FORTNIGHT MARKET.—The supply of home-fed beasts and sheep has been very limited, but of very good quality. We had also a small arrival of foreign beasts in good condition. The attendance of buyers was large, which caused the market to be brisk, with higher prices, and the whole were disposed of at an early part of the day. No. of beasts, 280.—Beef, 8s. to 8s. 4d. (prime) per stone of 16 lbs. No. of sheep, 2,200.—Mutton, 6½d. to 7d. per pound.

MAUCHLINE FAIR.—There was less than the usual amount of stock exposed for sale. On account of the fine weather and the consequent abundance of grass, there was a very brisk demand, and the greater proportion of the cattle changed hands before midday, at very high prices.

OTLEY FAIR.—So far as numbers went there was a fair supply, but the quality was not good. The long continued dry weather checked business, and prices were on the decline.

ST. TUDY FAIR was well supplied with cattle, yet but few sales were effected from the impression that prices would still decline.

THATCHAM FAIR was exceedingly well attended with dealers of all sorts of cattle, many having come from a considerable distance. There were nearly 3,000 sheep penned, and the greater part sold; the principal number being tegs of a very superior quality—prices ranged from 33s. to 42s. per head. One pen of 200 tegs, belonging to Mr. Darke, of Crookham, were exceedingly handsome, and were much admired; and which were purchased by Mr. Wm. Hobbs, of Woodhouse. The cow trade, although dull of late, rather rallied; and a fair share of business was transacted at a trifling advance over the preceding fairs: four very fine working oxen, the property of Mr. Frampton, of Midgham, were much admired. Mr. Pither brought a choice selection of horses; and, upon the whole, a very capital day's business was transacted. After the fair a large party sat down to an excellent dinner, at which Mr. Wm. Hobbs presided; and, after the usual loyal toasts had been drunk with enthusiasm, the silver cup, of the value of £5 5s., was awarded to Mr. Wm. Hobbs, as the largest purchaser.

TOLLER DOWN FAIR.—Business was by no means brisk, and prices were generally at a low figure. It was, however, numerously attended; but we neither observed many dealers, nor a disposition on the part of purchasers to increase their stock. The number of sheep penned was below the usual average, hardly reaching 4,000. The following are the general quotations of the prices of stock, namely, horn ewes (two lots), sold at 37s. each, and others at 34s.; horn lambs from 12s. to 18s.; down ewes from 27s. to 30s.; down lambs from 12s. to 15s.; cows with their calves fetched from £12 to £17; barreners from £10 to £12; calves from 30s. to 55s., of which description of stock there was an unusually large supply. Cart horses sold from £30 to £45; rams from £5 to £7; bulls averaged from £8 to £10. The atmosphere on this day exhibited a marked contrast to the beautiful weather experienced during the preceding three weeks, and the temperature was so low, accompanied with a heavy storm of hail and frequent showers.

YORK FORTNIGHT FAIR.—The show of fat beasts was only thin, and they were readily sold at prices varying from 6s. 9d. to 7s. per stone. The present dry weather keeps the pastures extremely bare, and this induces the graziers to supply the market very largely with their lean stock, but the demand is only limited, excepting for milch cows and in-calvers. The number of sheep shown was about an average one, and they were well bought up, realizing 6½d. to 7d. per lb. The lamb trade was tolerably active, and the pens were nearly all cleared at 8d. to 8½d. per lb.

DEVON AGRICULTURAL SOCIETY.—The annual exhibition of stock of this society took place on Thursday last, in the Castle Yard. The show was not large, but the quality was greatly superior to the average of former years. The sheep and pigs were particularly good, and the agricultural implements were more in number, and of greater practical utility than those exhibited last year. The dinner took place at Pratt's New London Inn, and was served up in capital style, but was not so well attended as it should have been, not more than sixty gentlemen having been present. John Sillifant, Esq., the High Sheriff of the county, presided, and John Yarde, Esq., officiated as vice-president. The Chairman, in proposing "prosperity to the Devon Agricultural Society," said they were now arrived at the time when agriculturists must consider themselves as manufacturers — as manufacturers of beef, mutton, and corn; and if they would succeed in that manufacture, they must improve their machinery—which consisted of the soil and farm-buildings. Unless the soil were placed in a healthy state, the trees cut down, and high hedges destroyed, and farm-buildings made fit for a respectable tenant to occupy, and for his cattle to make the best manure in, it was impossible that the agriculturist could manufacture beef, mutton, and corn, to the extent which the wants of the country required: the landowners must provide the capital, and the land would return a grateful increase. In no department could a better investment of capital be made than the judicious application of it to the soil and farm buildings. The tenant and landlord had a joint interest, and should go hand in hand (cheers). During the last few years they had learnt a very valuable lesson, which, if they laid it to heart, would be for the prosperity of agriculture and of the whole population. He believed the population were leaning far too much on the potato, which he would not call a cursed root, for he believed its proper use was a great blessing. But cultivated to the extent it had been five or six years ago, dependent as the labourer was on potatoes, not only for his piggery, but for himself and family, he believed it would have been a most serious affliction to this country if they had been led to depend on it further as an article of subsistence. But there was one lesson more which had been learnt. It was that the agricultural body must not look to law to support their interest, but to their own skill, talent, spirit, and enterprise. If they would really put their shoulders to the wheel, nothing could sink them either in this country or in competition with the world itself (cheers).

PROBUS FARMERS' CLUB.—At the monthly meeting Mr. Tresawna, the president of the club, brought under consideration the question of the proper time for cutting clover-hay and the best method of saving it. A useful, practical discussion followed, from which it appeared to be the general opinion of the members present that farmers in Cornwall leave their cutting to too late a period of maturity in the grass, and that then, they do not employ hands enough to give the grass such frequent turning as it ought to have in order to its being dried regularly and thoroughly. The grass should be cut just as it is getting into flower, and should by no means be left much later than that, because it gets dry at the bottom and injures the land. Any apparent deficiency, resulting from being cut early, would be compensated by the after grass. After the grass was cut, it could hardly be turned too frequently by day; at night it should be placed in cocks. About three or four days was considered a sufficient time between cutting and carrying, if the weather were fine. The point, however, on which the club appeared mostly to insist, was the necessity of cutting rye-grass early, seeing the grass contained no saccharine matter, and before its conversion into woody fibre. At the close of the discussion, thanks were given to Mr. Tresawna, and to the chairman for the evening. Mr James Davis.

METEOROLOGICAL DIARY—1848.

	Barometer.		Thermometer.			Wind and State.		Atmosphere.		
Day.	8 a. m.	10 p.m.	Min.	Max.	10p.m.	Direction.	Force.	8 a. m.	2 p. m.	10 p. m.
	in. cts.	in. cts.								
April 21	29.55	29.60	46	52	47	N. by West	gentle	cloudy	cloudy	cloudy
22	29.60	29.67	46	51	46	North	gentle	cloudy	cloudy	cloudy
23	29.76	29.78	45	54	46	N. by East	gentle	cloudy	cloudy	cloudy
24	29.74	29.89	44	47	43	N. by East	gentle	cloudy	cloudy	cloudy
25	29.90	29.93	39	48	40	N. by West	lively	cloudy	cloudy	cloudy
26	29.93	30.—	36	51	41	N.byW. N.E.	calm	fine	fine	fine
27	30.—	29.93	31	50	43	Southerly	variable	fine	cloudy	fine
28	29.80	29.94	39	53	45	N. by West	gentle	cloudy	sun	fine
29	30.05	30.09	37	55	45	N. by W. Ey.	calm	fine	sun	fine
30	30.15	30.25	37	55	45	E. by S. S.E.	v. gentle	fine	sun	fine
May 1	30.25	30.16	36	60	47	East	brisk	fine	sun	fine
2	30.16	30.16	38	56	50	East	lively	fine	sun	fine
3	30.17	30.19	40	67	53	E. by N.	lively	fine	sun	fine
4	30.23	30.23	45	65	55	Var. to E. by S.	lively	fine	sun	fine
5	30.23	30.24	47	66	59	S. East	lively	fine	sun	fine
6	30.24	30.20	47	68	62	S. S. by W.	gentle	fine	sun	fine
7	30.19	30.13	52	72	62	S. West	airy	fine	sun	fine
8	30.13	30.20	49	71	59	W. N. W.	airy	fine	sun	fine
9	30.23	30.30	48	68	59	N. E. by N.	lively	fine	sun	fine
10	30.35	30.38	49	73	59	E. N. E.	lively	fine	sun	fine
11	30.39	30.39	49	75	63	S.E. S. by W.	gentle	fine	sun	fine
12	30.38	30.30	53	77	62	S.E. Var.	gentle	fine	sun	fine
13	30.30	30.27	52	72	62	Every way	lively	fine	sun	fine
14	30.27	30.20	51	73	61	East	brisk	fine	sun	fine
15	30.17	29.97	53	75	65	South	lively	fine	sun	fine
16	29.86	29.70	56	76	61	S.W. S.E.	lively	fine	sun	fine
17	29.66	29.54	50	70	57	S. S. W.	lively	cloudy	sun	fine
18	29.54	29.80	53	63	50	West	brisk	fine	sun	fine
19	29.83	29.82	47	56	43	S. West	strong	cloudy	cloudy	fine
20	29.94	30.22	49	61	53	N. West	var. gen.	fine	cloudy	fine
21	30.36	30.30	45	61	56	N. W. S. W.	gentle	fine	cloudy	cloudy

ESTIMATED AVERAGES OF MAY.

Barometer.		Thermometer.		
High.	Low.	High.	Low	Mean.
30.308	29.160	70	38	54

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
62.6	45.16	53.88

Weather and Phenomena.

April 21: Some rain in afternoon. 22: Showery; clouds packing. 23: A few occasional gleams. 24: Very rainy. 25: Cloudy; a little rain. 26: Generally fine; frost early; some hail. 27: Hoar frost, with bright sun-rise; rain in the day. 28: Profuse morning rain; clearing—the close of the wet weather. 29-30: Perfectly fine; rather hazy at early morning.

Lunations.—Last quarter of the moon: 26th, 2 h. 20 m. afternoon.

May 1 and 2: Hoar-frost early; beautiful keen days. 3: Perfectly fine. 4, 5, and 6: Similarly fine; cool nights. 7: Warmer; sun-heat, max. 104 to 114 the three last days, with change of wind; the temperature has gradually increased to summer heat to the 16th inclusive; then the mercury fell and symptoms of change were visible. To this time the perfect transparency of the atmosphere had surpassed experience. A little distant thunder on most days between 15th and 20th, with refreshing showers: little rain, however, about Croydon. 20: A few slight showers; a thunder-storm in London. 21: Fine sunny forenoon; some small rain in evening.

Lunations.—New moon: 3rd, 7 h. 15 m. morning. First quarter: 10th, 2 h. 57 m. morning. Full: 18th, 6 h. 42 m. morning.

Remarks referring to Agriculture.

A period so magnificently sunny, and for so long a period, is scarcely within record: the wet has vanished; the corn strong like reeds, and fine in colour; everything in vegetable and animal nature bears a promising appearance; and so far we may hope the best. The rain, which appears coming on, will do much good, if it be not protracted; and should the warm weather soon return, wheat will be in flower by the 1st of June.

John Towers, Croydon.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF MAY.

Till very near the close of April we had constant and heavy rain, when a sudden change took place, and the weather during the first three weeks in May was altogether as dry as it had previously been wet. The surface of the land consequently became so hardened and baked, as to render it exceedingly difficult to work the heavy clays, and the sowing of Lent corn (attended with difficulties and vexations from the first) was finished nearly as unfavourably as it had been commenced. In many cases it has been found impossible to sow the land with the crops originally intended, and we feel satisfied that the breadth of barley, oats, &c., is less than in ordinary years; which circumstance, and the indifferent manner in which the seed, where sown, has been committed to the ground, render it highly probable that the produce of all spring corn and pulse will prove short. This being the prevailing opinion, a dry summer might lead to speculation in those articles, and as the old stocks are certainly small, a rise in prices is by no means unlikely to occur. The foregoing remarks are intended to refer only to Lent corn. In respect to the wheat crop, we are happy to be enabled to give a more favourable report than was the case at the end of last month. At that time the plant very generally wore an unhealthy appearance, the cold rains of March and April having impaired its vigour and imparted a sickly yellow hue to the blade. This has since been almost wholly changed, and at present there are very few complaints. Not only does the crop look well, but it is generally forward; and with fine weather during June, we might reckon on an early and productive wheat harvest. It is truly fortunate that this is the case, for we are certainly just now in a somewhat precarious position, and a deficient yield of the first staple article of food would indeed be a national calamity. The prostrated position of many branches of our manufactures and commerce has thrown large numbers of the industrious classes out of employment, and dear bread under such circumstances would be a double misfortune, which we trust will be averted. We must, however, confess that we see little chance of prices being much lower than they now are this side of harvest.

The stocks of foreign wheat have, for months past, been gradually diminishing, and are at present comparatively small. The war between Denmark and Prussia appears likely to be carried on with obstinacy, the friendly mediation of Great Britain having hitherto failed to arrange the difficulties arising out of the Schleswig Holstein affair. Other powers may be drawn into the quarrel; indeed Sweden is already, to a certain extent, involved. The Baltic ports are blockaded by the Danish fleet, and the Elbe and Weser are only open to neutral flags. This state of affairs must, of course, interfere with the regular operations of business, and prevent those supplies reaching us from the north of Europe which we might otherwise have calculated on. It is true that we stand in no immediate need of assistance from abroad, our own farmers having still a considerable proportion of their last crop of wheat on hand; but the knowledge that difficulties exist in transmitting foreign supplies will render the holders of what is here less anxious sellers, and a reduction in the value of wheat is therefore improbable. Within the last week or two, prices have shown a slight tendency to advance; but as yet there has been little disposition on the part of merchants or millers to purchase beyond what they have required for immediate use, the trade has therefore been more firm than brisk.

Whilst but little variation has occurred in the value of wheat, prices of other articles have been steadily creeping up in most parts of the country. Barley, notwithstanding the reported abundance of the last crop, has evidently become scarce, and fine malting qualities have brought very full terms up to the close of the season. At some of the western markets, 38s. to 40s. per qr. has been paid; and in London, as much as 36s. has been realized; latterly however these extreme rates have not been maintained.

Oats have also risen, and are certainly worth about 2s. per qr. more than they were in the early part of April. The most material advance has, however, been in Beans and Peas, which articles are supposed to have suffered more from the drought than any other. The actual variations will, however, be more particularly given in our remarks in reference to the operations at Mark Lane, which we are now about to record.

The arrivals of Wheat coastwise into London have been very small throughout the month, and there has been a progressive falling off week by week. Not only have the receipts by water been scanty, but the quantity brought forward by land-carriage samples from the home counties has been

equally unimportant; and had it not been for the assistance of the new foreign, the millers would have found it difficult to have secured sufficient fresh wheat to have kept their mills going. So long, however, as there is no absolute want, there is no anxiety to buy more than needed; and business has during the greater part of the month remained in a decidedly dull state. In the commencement of May prices receded, and though a slight rally has since occurred, quotations are lower now than they were at the close of April. On Monday, the 1st instant, the Essex and Kent stands, though very indifferently supplied, were not cleared until factors submitted to a reduction of 1s. to 2s. per quarter. On that day week the downward movement continued, a further abatement of 1s. to 2s. per quarter having to be acceded to before the millers would purchase; since then, however, sellers have manifested more firmness, and have declined making any further concession.

The cause of the abatement which the value of English wheat has undergone has unquestionably been the pressure of foreign on the market. In the early part of the month the supplies were tolerably large; and though for a week or two little arrived, we have within the last week again had a good supply. The importers have generally been anxious to sell from on board ship to avoid landing expenses, and capital qualities of red wheat, weighing 62lbs. to 62½lbs. per bushel, have been offered at 50s., and lighter descriptions still cheaper. The insignificance of the home supplies has, therefore, been but little felt; and so long as we are enabled to import from Hamburg, &c., at under 50s. per quarter (which is still the case, notwithstanding the 8s. duty), the rough coarse qualities of English are not likely to meet with much favour.

The value of foreign wheat has fluctuated less than that of home growth. The fall on the former has at no period since the close of April been more than 2s. per quarter, and quotations are scarcely now even so much lower, some of the holders having within the last week shown a disposition to raise their pretensions, particularly for inferior granaried parcels, which have been in request on Irish account. Of fine Danzig and Rostock hardly any remains on the market, and the business has been principally in Hamburg, and similar qualities of red wheat. A small importation from Australia has taken place, of beautiful quality; this wheat is much liked by the town millers, and commands higher prices than the finest English: the parcel in question was sold at 62s. to 63s. per qr. But as freight from that distant part of the world is very heavy, we doubt whether the importer will derive any great profit on his venture.

In quotations of flour scarcely any change has taken place: the nominal top price of town-made has remained fixed at 46s. per sack; and though household flour was at one time offered at a slight abatement, the decline has since been recovered, and quotations are now very nearly the same as they were at the end of last month. In American flour the transactions have been comparatively unimportant, owing to the want of good fresh qualities, the imports having for some time been very trifling, and the little remaining in warehouse being stale or more or less unsound.

On the 18th of May the duty on wheat rose to 8s., and flour of foreign manufacture is, therefore, at present subject to the payment of 4s. 9d. per barrel.

The arrivals of home-grown barley into London have been scanty in the extreme; and though most of the maltsters left off work when the hot weather first set in, still there have been buyers from time to time of small quantities, and what has been brought forward has been disposed of without difficulty. Good malting sorts have commanded 35s. to 36s. per qr., and, in one instance we know the latter price was refused for a choice sample. Secondary sorts have within the last week become dull of sale, owing to a rather liberal arrival of foreign: hitherto, however, no reduction has occurred in the value of this grain. Purchases on a somewhat extensive scale have been made during the last month or two on English account at some of the continental ports, and as British vessels have been engaged where the Prussian flag is not allowed to pass, we may calculate on some further receipts of foreign barley. If, however, the growing crop does not undergo a most wonderful improvement, all that may be imported is likely to be wanted.

The upward movement in prices of barley has had the usual effect on those of malt, and the latter article has risen 2s. to 3s. per qr., the best parcels of Ware being at present worth 61s. to 62s. per qr. The stocks do not appear to be heavy, and holders seem to be very sanguine, manifesting no anxiety to press sales.

Up to the close of last month we received good supplies of Irish and foreign oats, which to a certain extent prevented the smallness of the supplies from our own coast and Scotland being felt; latterly, however, the arrivals have been scanty from all quarters, and prices have consequently risen, notwithstanding the cautious manner in which the large dealers have conducted their operations. During the first three weeks in May the advance was not less than 2s. 6d. to 3s. per qr., and good Scotch feed, which were obtainable at the close of April at 21s. to 22s., realised 23s. 6d. to 25s. per qr.; whilst other sorts brought corresponding terms. Within the last ten days a few cargoes have

appeared from the near continental ports, which has had the effect of checking the upward tendency; indeed, a small reaction, to the extent of 6d. to 1s. per qr., has in some instances taken place. That the stocks of oats are unusually light both here and in the country is, we think, certain; and unless we get good supplies either from Ireland or from abroad, prices are likely to be well maintained; indeed, a further advance does not appear by any means an unlikely event.

Beans, which were very much neglected up to the close of April, have since met with a good deal of attention, and have steadily advanced in value. The rise on English may be estimated at fully 3s. per qr. from the lowest point, and Egyptian have got up quite as much. Good parcels of the latter, such as were at one time obtainable at 22s. to 23s. per qr., duty paid, have lately been held at 26s., and would have found ready takers at 25s per qr. For cargoes to arrive, and subject to pay the 2s. duty, as much as 23s. per qr. has, we believe, been paid. The quantity still on passage from Alexandria and the Mediterranean is not very accurately known, but the prevailing opinion is that it is not so great as likely to produce any depressing effect on quotations.

The upward movement has been quite as decided in prices of peas as in those for beans, and good white boilers have of late been selling in the London market at 38s. to 40s. per qr. Grey and maple have participated in the advance, and similar parcels to what were sold at 34s. to 35s. are now worth 37s. to 39s. per qr.

A good many parcels of foreign beans and peas have been withdrawn from the market, holders reckoning on higher rates in case the dry weather continues.

The rise in other sorts of feeding stuffs has had the effect of causing attention to be directed to Indian corn. In parcels on the spot the operations have not been very important; but for cargoes on passage (having orders to call at Falmouth or Cork for directions regarding the port of discharge) there has been a good deal of inquiry on Irish account, and several bargains have been closed at 28s. to 30s., cost, freight, and insurance, for the finer sorts, such as Galatz.

In taking our usual notice of the position of affairs at the different foreign markets, we can scarcely avoid once more alluding to the state of uncertainty of the political horizon. Whether we turn to the north or the south of Europe, all is confusion; trade is crippled, and at a complete stand; and merchants puzzled how to act. It is therefore impossible to make anything like an accurate estimate of what extent of supplies we may receive from abroad; but that far less grain will be shipped than would have been the case if affairs had been in a more settled state, is unquestionable. The position of our market, nevertheless, continues to have an influence on prices on the continent; and so long as there is a possibility of shipping corn to this country without running any great risk of capture, it will be done.

The accounts from Danzig state that until the time allowed by the Danish fleet for neutral flags to pass had expired (20th instant), British vessels were eagerly taken up to load wheat, and that several cargoes had been despatched. The prices paid had been 37s. to 38s. per qr., free on board, for fine mixed qualities, weighing 60lbs. per bushel.

At Rostock comparatively little appears to have been done; the smallness of the stock at that place, and the scanty nature of the supplies brought forward, having caused holders to ask more money than the limits of the English orders had permitted buyers to pay. The best samples in granary had been held at equal to 40s.; and secondary sorts at 38s. per qr., free on board.

From Stettin the reports are of a similar nature; but sellers had not been quite so high in their pretensions at the latter place, good 61 to 62 lb. qualities having been offered at 36s. to 37s. per qr.

The passage of the Elbe having remained free for neutral flags, a good many purchases of wheat have been made at Hamburg, principally of good Upland, for which equal to 39s. to 41s. per qr. has been paid.

In Holland and Belgium hardly any business has been done in wheat for export; but some quantity of oats has been purchased at Dutch ports on British account. The prices paid have varied from 16s. to 19s. per qr., according to weight, quality, &c.

From the Mediterranean the advices are almost wholly without interest. Fine Polish Odessa wheat was, according to the most recently-received accounts, worth close upon 40s. per qr., at the ports where any stocks were held; which price excludes English buyers altogether.

We have letters of very recent dates from the United States. Flour was then still too high, as compared with its value here, to lead us to expect large imports from that quarter; and the discouraging accounts from England had had the effect of preventing shipments. The arrivals from the interior at the ports on the sea-board had, however, up to that time, been too small to lead to any depression in price, and with comparatively little export demand, from 6⅝ d. to 6¾ d. per barrel had been paid for good brands of western at New York. The value of Indian corn had also been much more firmly maintained than might have been expected, considering the reported abundance of the yield of last year's crop; and we are

not likely to be so much overdone with supplies of this article as was generally believed on this side would be the case.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter. NEW.		OLD.	
Wheat, Essex and Kent, white	48	to 55	50	to 56
Ditto red	44	48	48	51
Norfolk and Suffolk	43	47	—	—
Lincolnshire and Yorkshire	—	—	45	52
Rye	32	34	—	—
Barley .. Essex, com. Malting	32	35	—	—
Kent, Norfolk, Distillers' & Grinding	29	32	—	—
and Suffolk .. Chevalier	33	35	—	—
Malt .. Essex, Norfolk and Suffolk	—	—	56	58
Kingston, Ware, and town made	—	—	58	61
Oats .. Norfolk, Cambridgeshire, Lincolnshire, and Yorkshire, feed	—	—	19	22
Ditto, Poland and potato	—	—	22	25
Northumb., Berwick, & Scotch potato	—	—	24	27
Ditto, feed	—	—	22	24
Devon & West Country, feed or black	—	—	17	20
Dundalk, Newry, and Belfast, potato	—	—	22	24
Ditto, feed	—	—	20	23
Limerick, Sligo, and Westport, potato	—	—	21	24
Ditto, feed	—	—	20	23
Cork, Waterford, Dublin, Youghal, and Clonmel, black	—	—	16	20
Beans .. Ticks	33	35	40	42
Harrow and small	35	40	44	53
Peas .. Boiling	37	40	—	—
Hog and grey	35	38	—	—
Flour .. Town made (per sack of 280 lbs.)	—	—	41	46
Norfolk and Suffolk, household (do.)	—	—	34	37

FOREIGN GRAIN.

	Shillings per Quarter.		FREE.	
Wheat .. Dantzic and Konigsberg, finest high mixed	51	to 56		
white				
Ditto, good mixed	50	51		
Ditto, red mixed	45	47		
Stettin and Rostock	49	52		
Danish	45	49		
Hamburgh and Pomeranian	47	49		
Black Sea (nominal) hard to soft	38	42		
Riga, St. Petersburgh, and Liebau, soft	32	40		
Canada	47	49		
Spanish	52	55		
Buck or Brank	32	34		
Indian Corn	28	32		
Barley .. Hamburgh, Dantzic, Konigsberg, and Riga	27	32		
Ditto, Grinding	25	28		
Danish, Mecklenberg, and Pomeranian	27	32		
Oats .. Dutch, brew, & Poland, Friesland, & Groningen	22	26		
Danish and Swedish	18	22		
Russian	18	21		
Beans .. Tick	34	36		
Small	42	45		
Mediterranean	24	26		
Peas .. White boiling	37	39		
Tares	30	35		
Flour .. United States	22	27		
Canadian	22	26		
Indian Corn Meal (per brl. of 196 lbs.)	12s.	to 12s. 6d.		
Rye Flour (per ton)	£6	0s. to £6	10s.	

PRICES OF SEEDS.

The transactions in the seed market were on quite a retail scale, and quotations underwent no change requiring notice.

IMPERIAL AVERAGES.

For the last Six Weeks.

Week Ending:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans. s.	d.	Peas. s.	d.
Apr. 15, 1848..	49	7	32	2	19	11	28	10	35	6	36	11
Apr. 22, 1848..	48	10	32	1	19	8	29	7	35	3	38	2
Apr. 29, 1848..	49	6	31	10	19	8	29	0	34	9	37	6
May 6, 1848..	50	1	32	4	19	8	31	11	35	7	36	3
May 13, 1848..	49	10	32	8	20	2	29	10	35	6	35	9
May 20, 1848..	48	4	32	7	20	4	29	2	36	3	35	9
Aggregate Average of the six weeks which regulates duty	49	4	32	3	19	11	29	9	35	6	36	9
Comparative Average same time last year	81	10	50	11	31	6	58	7	52	10	54	5
Duties	8	0	2	0	3	0	2	0	2	0	2	0

Account shewing the Quantities of Grain and Flour imported into the United Kingdom during the month ended 5th May, 1848, the quantities admitted for Home Consumption during the same month, and the quantities remaining in Warehouse at the close thereof.

Species of Grain.	Quantity imported.		Quantity entered for consumption		Quantity remaining in warehouse.	
	qrs.	bush.	qrs.	bush.	qrs.	bush.
Wheat, from British Possessions	490	0	450	0	40	0
Barley, do.	—		—		—	
Oats, do.	—		—		—	
Peas, do.	—		—		—	
Beans, do.	—		—		—	
Maize or Indian Corn, do.	—		—		—	
Wheat, foreign	137255	1	115643	7	37222	5
Barley, do.	45169	1	44426	6	961	3
Oats, do.	67134	4	67111	3	2147	5
Rye	31	0	31	0	—	
Peas, do.	6972	7	6278	0	1267	2
Beans, do.	61000	6	53622	3	8069	7
Maize or Indian Corn, do	121303	4	122143	7	772	7
Buckwheat	—		—		—	
	cwts.	qrs. lbs.	cwts.	qrs. lbs.	cwts.	qrs. lbs.
Flour from British Possessions	1087	0 22	874	1 10	212	3 12
Flour, foreign	16634	1 12	10628	3 1	6654	2 2

POTATO MARKET.

SOUTHWARK WATERSIDE, May 29.

Trade during the past week has been very heavy, which has caused a considerable reduction to be submitted to in the price of Yorkshire Regents. The following are the present quotations :—

	s.	s.		s.	s.
York Regents	120	to 150	Scotch Reds	120	to 130
Do. Reds	140	to 160	Do. Whites	90	to 100
Wisbeach Regents	100	to 120	Belgian Whites	80	to 85
Scotch Cups	120	to 140			

HOP MARKET.

BOROUGH, Monday, May 29.

Our market continues steady, without much business doing; the recent advance in prices being fully maintained. Sussex Pockets, 65s. to 72s.; Weald of Kents, 68s. to 75s. Horton and Hart.

END OF VOLUME XXVIII.

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